

NATIONAL CONVENTION OF MAYORS AND COUNCILMEN,  
COLUMBUS, OHIO, SEPT. 28 TO OCT. 1, 1897.

\$3.00 a Year; \$4.00 to Foreign Countries.

Single Copies, 25 Cents.

# CITY GOVERNMENT

SEPTEMBER. 1897.

## IN THIS NUMBER:

Program and Full Particulars of the National Convention of Mayors and Councilmen, to be held at Columbus, Ohio, September 28—October 1.

The Second Annual Convention of the National Street Lighting Association.

History of the American Society of Municipal Improvements.

Three Settled Points Pertaining to Ownership and Operation of Public Service Industries.

Relief from Violent Fluctuation in Direct Pressure Water Supply.

Several Subjects Discussed at the Convention of the International Association of Fire Engineers.

### DEPARTMENTS:

Fire and Police—Taxes and Finance—Light and Water—Public Improvements—Schools and Libraries—Parks and Boulevards—Public Health—Personal—Trade Notes

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devoted to the  
practical Affairs  
of Municipalities

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The **BAG CARRIER**, shown in the cut, is the principal instrument used in this method. It is equipped with a dozen bags, the bag in use being held in position by means of twirrings at the top, and the extra supply is carried on a cross bar for that purpose. As fast as the streets are swept, the sweepings are taken up and placed in one of these bags which when full is tied with a cord, and stood on the edge of the sidewalk. Another bag is placed on the carrier and the cart is again ready for use. The full bags are collected at any convenient time by a suitable vehicle and taken to the dump, where they are emptied and, after cleansing, are used again on the streets.

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The work of shoveling the sweepings from the street into the carts is entirely done away with, thus avoiding a great nuisance, especially on windy days. The dirt is not exposed to the wind from the time it is first placed in the bag till it is released at the dump. No delay is caused in the work of the sweeper by the carts not being on hand to empty the receptacle when full, as with the hokey-pokey, for as many empty bags can be carried as needed for the whole day's work.

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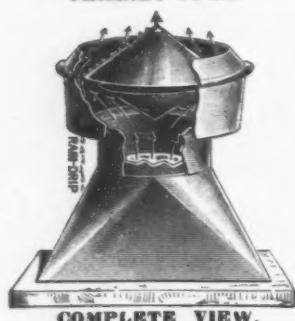


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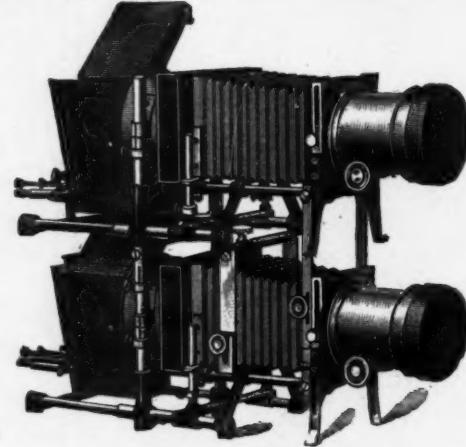
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OUR SYSTEM SAY THERE IS  
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A SYSTEM UNTIL YOU HAVE  
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Made in eight sizes, with governors on larger sizes only.

**DEPARTMENT OF PUBLIC WORKS.**

**BUREAU OF WATER REGISTER.**

NEW YORK, December 30, 1896.

Record of Test of  $\frac{5}{8}$  in. Standard Water Meter.

Size of Outlet.	No. of feet of water passed through Meter.	Time of Test, hours and minutes.	Head pressure, pounds.	Back pressure, pounds.	Register of Meter.	No. of feet of water in tank.
$\frac{5}{8}$ in.	100	28m. 28m.	34 34	7 7	$100\frac{8}{15}$ <b><math>101</math></b>	100
$\frac{1}{2}$ in.	100	40m. 40m.	34 34	22 22	$100\frac{7}{15}$ <b><math>101\frac{2}{15}</math></b>	100
$\frac{5}{8}$ in.	50	30m. 36m.	34 34	28 28	$50\frac{4}{15}$ <b><math>50\frac{9}{15}</math></b>	50
$\frac{3}{4}$ in.	50	1h. 1h.	34 34	32 32	51 <b><math>51\frac{3}{15}</math></b>	50
$\frac{1}{2}$ in.	25	2h. 2h.	34 34	33 33	$25\frac{4}{15}$ <b><math>25\frac{7}{15}</math></b>	25
$\frac{1}{4}$ in.	25	5h. 5h. 8m.	34 34 32	33 33 31	$25\frac{1}{15}$ <b><math>25\frac{4}{15}</math></b> <b><math>25\frac{1}{15}</math></b>	25
$\frac{1}{8}$ in.	25	19h. 35m.	34 32	$33\frac{1}{2}$ <b><math>31\frac{1}{2}</math></b>	$25\frac{8}{15}$ <b><math>25\frac{1}{15}</math></b>	25

NOTE.—Figures in heavy-faced type denote results of second test after 100,000 feet of water passed through meter.

A. S. GEAR,  
General Foreman, Dept. of Public Works,  
in charge of Corporation Yards.

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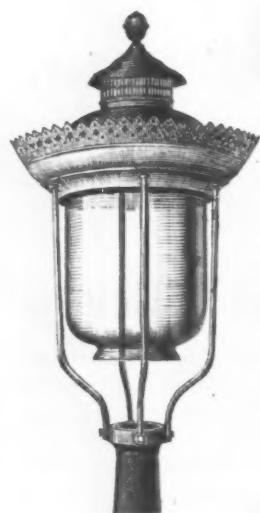
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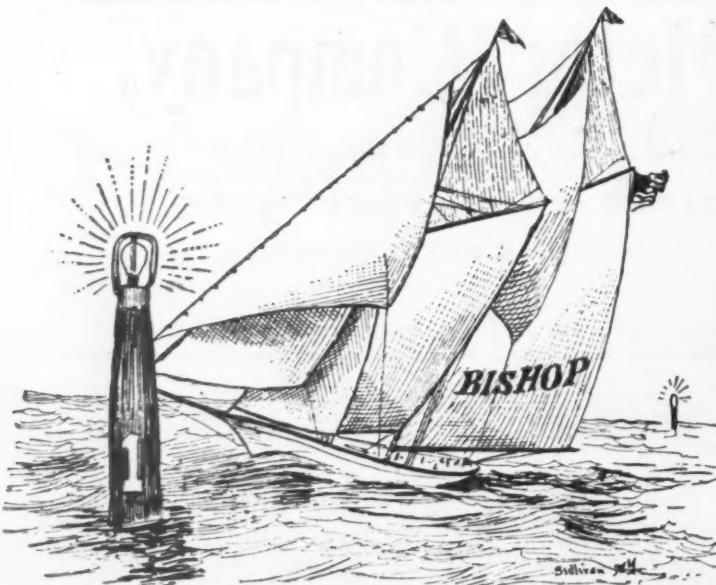
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NEW YORK CITY.

# CITY GOVERNMENT.

[Entered as Second-Class Matter at the New York, N. Y., Post Office, August 12, 1896.]

VOL. 3. No. 3.

NEW YORK, SEPTEMBER, 1897.

\$3 A YEAR.

## CITY OFFICIALS TO MEET AT COLUMBUS.

HUNDREDS OF MAYORS, COUNCIL MEMBERS  
AND OTHER OFFICIALS WILL  
BE PRESENT.

An Interesting Programme Arranged—Street Lighting  
Men Join the Procession.

As CITY GOVERNMENT goes to press word is received from Mayor Black, of Columbus, that the Western Passenger Association has made a rate of a fare and a third for the round trip for all who desire to attend the National Convention of Mayors and Councilmen at Columbus. This

officials to avail themselves of every opportunity to study the multitudinous and vexatious problems that are encountered in the administration of municipal affairs.

Not only have the officials themselves readily recognized the possibilities for beneficial results from the Columbus convention, but nearly all the daily newspapers of any consequence in the country have editorially endorsed the objects of the meeting, and urged a proper representation of their local interests.

Among the first great newspapers to give the convention extended notice were the New York *Herald*, the New York *Times* and the New York *Tribune*, each of which has devoted considerable space to promote interest in this important event. No national convention, outside of those of the great political parties, has ever received from the press such elaborate notice as has been given the mayors and councilmen's meeting, which has been generally recognized as an event of the utmost importance, because it cannot fail to result beneficially to the taxpayers, who are the supporters and the very life of our growing municipalities.

Every phase of departmental municipal work is to be discussed



rate will also be made by all other passenger associations, so that the rate from all parts of the country will be a fare and a third for the round trip. Delegates to the convention of the National Street Lighting Association may avail themselves of the same rate.

All officials and others in New England and Eastern States, who expect to attend the conventions at Columbus, may join in a party at New York and journey from that point to Columbus on a special train. Parties along the route between New York and Columbus may also arrange to board this special train at any station. Full particulars as to rates and time schedule will be gladly furnished upon application to B. F. Gilkison, publisher of CITY GOVERNMENT.

Hundreds of mayors, council members and other city officials in all parts of the country have signified their intention of being present at the National Convention of Mayors and Councilmen and the auxiliary meetings, to be held at Columbus, Ohio, September 28 to October 1. Letters already received by the general committee and by CITY GOVERNMENT indicate that the attendance of the convention will be largely in excess of what was at first expected. There is a deep and widespread interest in this national gathering, which denotes the inclination of the city

at the Columbus meeting by men of experience and well-known experts. The programme has been arranged as follows:

TUESDAY, SEPT. 28TH.

10 o'clock A. M.

Call to order by Samuel L. Black, Mayor of Columbus and Chairman of the General Committee.

Address of welcome by Asa S. Bushnell, Governor of Ohio.

Response by Carter H. Harrison, Mayor of Chicago.

2 o'clock P. M.

### FIRE AND POLICE DEPARTMENTS.

Papers by experts on the construction, maintenance, protection and inspection of electric wires by municipal authorities, and the increase in dangers of fire by imperfect electrical wiring.

General discussion by officials of fire and police department work.

WEDNESDAY, SEPT. 29TH.

10 o'clock A. M.

### MUNICIPAL OWNERSHIP.

Leading addresses by well-known authorities on the question of municipal ownership of lighting and water plants and street railways.

General discussion by officials of the subject of municipal ownership, the granting of franchises to private companies and the possibilities of revenue therefrom.

2 o'clock P. M.

### STREET LIGHTING.

Addresses and papers by officials and experts on the cost of

lighting by contract and by municipal plants, the feasibility of municipal ownership and various systems of street illumination.

Participation in the discussion by the delegates to the annual convention of the National Street Lighting Association.

8 o'clock P. M.

Address: "Uniformity of State Laws Pertaining to Municipal Government," by J. A. Johnson, Mayor of Fargo, N. D.

Address: "The Federal Plan of Municipal Government," by Dr. Washington Gladden, of Columbus, Ohio.

Address: "Municipal Affairs as Administered in Boston," by Josiah Quincy, Mayor of Boston.

Address: "Outdoor Relief by Municipalities," by Hazen S. Pingree, Governor of Michigan and former Mayor of Detroit.

THURSDAY, SEPT. 30TH.

10 o'clock A. M.

**STREET CLEANING AND GARBAGE DISPOSAL.**

Leading addresses by officials and experts on various methods, and the cost of street cleaning and garbage disposal.

General discussion of the topic by all the delegates.—Questions and answers.

2 o'clock P. M.

**STREET PAVING.**

Papers on asphalt, brick, granite and all other kinds of paving materials by civil engineers and other experts.

General discussion of the comparative qualities, practical uses and cost of the various paving materials.

Report of Committee on Formation of Association.

8 o'clock P. M.

Entertainment tendered to the visitors by the citizens of Columbus.

FRIDAY, OCT. 1ST.

10 o'clock A. M.

**WATERWORKS AND SEWERAGE.**

Addresses by experienced officials and experts on public water supply, the necessity for and methods of filtration, and on various methods of sewage disposal.

General discussion.

2 o'clock P. M.

The election of officers of the association and the preparation of plans for next meeting.

3:30 o'clock P. M.

Annual Inspection of Columbus Fire and Police Departments.—Street parades by both.

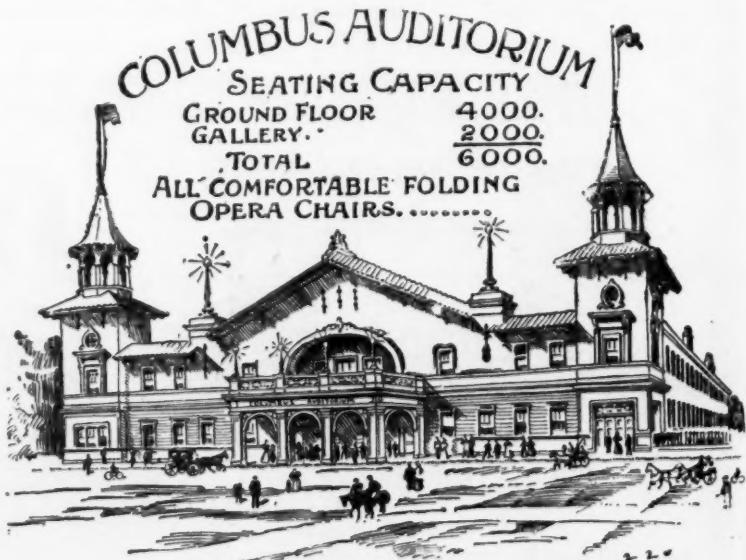
The speakers on the various topics are not named in the above programme, excepting in the case of the evening session, which will most probably be an open meeting for the general public. At this session Hon. J. A. Johnson, Mayor of Fargo, N. D., is set down for a brief address on "Uniformity of State Laws Pertaining to Municipalities." Mayor Johnson was the leading spirit of a convention of the mayors of his State last year, held for the purpose of securing a uniform system of municipal government, and he comes to Columbus from distant North Dakota to tell of the successful results of that gathering. Dr. Washington Gladden, of Columbus, will describe the "Federal Plan of Municipal Government," which is in vogue in his city and other Ohio municipalities. The other speakers of the evening session are Gov. Hazen S. Pingree, of Michigan, and Mayor Josiah Quincy, of Boston, both of whom are known throughout the land, one as the originator of the famous "potato patch" idea and the relentless foe of street railway corporations, and the other as the most efficient and progressive mayor the big New England metropolis ever had. Gov. Pingree and Mayor Quincy have both assured the general committee that they will be present.

The list of mayors and councilmen who will speak on the various topics to be discussed at the other sessions is very long, and includes representatives from every section of the country and from cities of all sizes. Among the experts who have accepted invitations to address the convention we may mention Col. George E. Waring, Jr., the famous street cleaning commis-

sioner of New York; S. F. Peckham, of Ann Arbor, Mich., an analytical chemist, who has given especial attention to the study of asphalt as a paving material; Col. W. F. Morse, of New York, whose addresses on garbage disposal have been the particular features of the last two or three conventions of the American Public Health Association; Edward B. Weston, C. E., of Providence, whose thorough understanding of water filtration is the result of years of study and many practical tests; Alexander Potter, C. E., of New York, who is well known as an authority on garbage and sewage disposal and the construction of sanitary sewers; Edward M. Grout, the last Democratic candidate for mayor of Brooklyn and a learned advocate of municipal ownership; Allen Ripley Foote, of the United States Bureau of Labor and Statistics, and former secretary of the National Electric Light Association; William Brophy, chief electrician of the city of Boston, and W. F. Conant, general manager of the municipal lighting plant at Detroit.

**EXHIBITS TO FORM AN INTERESTING FEATURE.**

An interesting feature of the convention will be the exhibition of all kinds of apparatus, appliances, machinery and materials used by municipalities. The exhibition will be given in the Auditorium Building and on the streets, and will comprise fire and police telegraph systems, electrical apparatus and supplies used by municipalities for lighting, telegraphic and other purposes, garbage wagons and garbage reduction plant, fire engines,



trucks and wagons, paving materials of every description, street sweeping machines, street sprinkling wagons, road making machinery, street lamps of all kinds, pumping engines, water filters and meters, fire hydrants, etc. A large number of the leading manufacturers in these lines have already reserved space for exhibits, and applications are still coming in to Mr. B. F. Gilkison, of CITY GOVERNMENT, who has charge of this feature of the convention. Mr. Gilkison will be in Columbus several days prior to the opening of the convention, and will give all possible assistance to exhibitors. No charge of any kind is made for space, as the exhibits are being arranged solely for the purpose of interesting the hundreds of city officials who will be at the convention.

**THE LOCAL COMMITTEES.**

The following committees, composed of citizens of Columbus, have been appointed:

**RECEPTION**—J. Y. Bassell, W. D. Brickell, F. F. Bonnett, William Felton, Tod B. Galloway, George J. Karb, Samuel A. Kinnear, Dennis Kelley, E. N. Higgins, Joseph N. Neil, O. A. Miller, Joseph C. Cross, W. C. Orr, W. V. Baker, Samuel Pentland, W. S. Stimson, L. C. Stevens, Samuel G. McClure, Samuel Stevens, E. K. Stewart, C. O. Tracy, W. H. McDermith, L. E. Valentine, Wheeler J. Young, Charles A. Pearce, Frank Merrick, F. C. McElroy, O. M. Evans, William Fisher, C. Chris Born, Theodore Schlee,

John W. Dages, John G. Deshler, W. D. Park, W. T. Cope, J. W. Meek, Rev. Washington Gladden, F. W. Hubbard, C. R. Gilmore and Cyrus Huling.

FINANCE.—R. M. Rownd, chairman; Fred Lazarus, W. H. McDermith, Lloyd Myers, Thomas E. Knauss, Nathan Munshower, R. J. Fanning and J. Ed Kimmick.

COUNCIL.—Mark Ellerman, president City Council; Levi Douglas, Otto Nusbaum, T. J. Black and John P. Slemmons.

PRESS.—H. C. Barlow, *Dispatch*; Charles F. Kipp, *Press*; J. S. Mosgrove, *Journal*; Elsworth Dildine, *Der Westbote*; Frank Koehne, *Express*; V. C. Evans, *Dispatch*; J. Howard Galbraith, *Press*; T. A. Cooper, *Journal*, and J. B. K. Connelly, *Sunday News*.

#### EXTRACTS FROM LETTERS RECEIVED.

"I acknowledge receipt of CITY GOVERNMENT for August, and have been very much interested in the elaborate account of the proposed meeting of the mayors and councilmen at Columbus,

vention of Mayors and Councilmen. Much good must evidently result from the opportunity thus afforded public officials from all sections of the country to exchange views of the enormous and perplexed problems of municipal government. Such questions as methods of local improvement assessments, street lighting and pavement, public water supply, and the granting of municipal franchises to private corporations are daily receiving more systematic and enlightened and conscientious study, and an exchange of views on such vital topics cannot fail to be fruitful of many beneficial results. If this conference should achieve nothing further than to awaken and foster a conscious recognition of the many existing questions of common interest, and a desire for mutual co-operation in the direction of good government, the same would deserve and receive the unqualified commendation of all good citizens."—ARMAND ALBRECHT, Member Council, St. Paul, Minn.

"I have your letter of the 24th, calling attention to the conference of mayors to be held in Columbus, and am pleased to



HIGH STREET, COLUMBUS—LOOKING SOUTH FROM STATE STREET. 2-2-1

Ohio. I believe that this movement is fraught with immense possibilities for the solution of many vexed problems of municipal administration. At the recent meeting at Louisville of the National Municipal League, over which I had the honor to preside, the desirability of such a convention was freely discussed and heartily approved. I notice that I am on the General Committee, and shall be very glad indeed to assist in any way that lies within my power."—GEORGE W. OCNS, Mayor of Chattanooga, Tenn.

"I will be very glad to lend any assistance in my power to this movement, and you have my hearty support to the best of my ability."—W. F. HITE, Mayor, Huntington, W. Va.

"I am deeply interested in the movement of holding a national convention of the mayors and councilmen of the United States. It will be a great benefit to get together and exchange views as to the best manner of conducting the affairs of our various cities."—C. A. FELLOWS, Mayor of Topeka, Kan.

"I am most heartily in accord with the spirit which promoted your organization of so excellent a scheme as the National Con-

say that I look forward to it with a great deal of interest. As you indicate, it cannot help but be profitable to those who attend, as well as to the country at large. I am making calculations to be present with you on the occasion, and will be pleased to aid in any way I can with the preliminary arrangements. Trusting you will feel at liberty to command me, if I can be of service to you."—SAMUEL M. JONES, Mayor, Toledo, Ohio.

"I shall endeavor to attend the meeting and do anything that may be in my power to make it a success. Sickness or some unforeseen cause will be the only thing that will prevent me from attending."—J. A. JOHNSON, Mayor, Fargo, N. Dak.

"I heartily approve and am in sympathy with the national convention to be held by the different mayors of the United States at Columbus. I am satisfied it will prove beneficial and will meet with good results. Peoria, the second city in Illinois, will be represented on that occasion."—JOHN WARNER, Mayor, Peoria, Ill.

"I shall take great pleasure in attending the convention of

mayors and aldermen to be held at Columbus, September 28 to October 1 next, and shall be glad to contribute in any way to make the meeting a success. I am constrained to believe that the convention, although quite a new departure in municipal circles, will be productive of much good. I expect that my immediate neighbors, Mayors S. F. Smith, of Davenport, and Gustav Swenson, of Moline, Ill., will also be present."—THOMAS J. MEDILL, JR., Mayor of Rock Island, Ill.

"I am planning to attend the mayors' convention at Columbus the latter part of September. Kindly engage a comfortable room for me in a suitable hotel, and advise me. Probably my wife will accompany me. I have lately returned from attendance at the American Bankers' Association at Detroit, where the entertainment was superb. However, we should care more for business than for pleasure outside. I believe that the convention may result in good to our cities."—S. F. SMITH, Mayor, Davenport, Ia.

"I shall endeavor to bring a large delegation of citizens interested in the advancement of municipal government to Columbus."—Gustav Tafel, Mayor, Cincinnati.

"I am to report that I expect to attend the meeting of the national association of mayors and councilmen \* \* \* and I shall endeavor to do what I can to promote the success of the meeting and the objects in view. \* \* \* I am thoroughly satisfied that great good can, should, and will result from such meetings."—M. H. Levagood, Mayor, Elyria, Ohio.

"I shall endeavor to be present, together with other members of the city government. \* \* \* This meeting cannot be but of the utmost good to all who may be able to attend, and I trust there will be a large delegation from all parts of the United States, and that a free interchange of opinions relative to municipal government may be exchanged."—H. C. Powell, Councilman, Worcester, Mass.

"It will afford me great pleasure to be present at the Columbus convention, and I will urge as many of our councilmen and other officials as possible to accompany me."—H. C. BARR, Mayor, Altoona, Pa.

"I will be present with at least one member of our council. The move is certainly a good one. This city owns water and lighting plants, both of which are operated very successfully. We are greatly in favor of the convention movement."—F. G. PIERCE, Mayor, Marshalltown, Ia.

"I take a lively interest in the proposed convention of mayors and councilmen in Columbus, and while I have not yet accepted an invitation to be present, I shall certainly make every effort to be on hand."—JOSIAH QUINCY, Mayor, Boston.

"I think this will be a meeting that will be of great benefit to the entire United States, and I have assurances that a committee of the common council of the city of Atlanta, with the mayor, will attend the conference. I will do all I can to see that a special committee attends, as I know that the results attained will be of great benefit to our city."—GEORGE P. HOWARD, Councilman, Atlanta, Ga.

"Being heartily in favor of this movement it is my purpose to attend this convention, and I hope to be able to induce some one or more of our councilmen to attend."—F. V. EVANS, Mayor, Birmingham, Ala.

"I am heartily in sympathy with the movement you have inaugurated, and will be glad to further the enterprise in any way possible. I think that my State will be largely represented at the first national convention. I trust that I shall be able to be present, but am unable to state positively at this time."—ARCH B. CALVERT, Mayor, Spartansburg, S. C.

#### COMPTROLLERS AND AUDITORS TO MEET.

The following letter, bearing the signatures of Chairman Black, H. L. Rossiter, director departments of accounts, and Albert F. Crosby, deputy city auditor, of Cleveland, Ohio, has been sent to the comptrollers and auditors of the principal cities:

"We send you herewith a circular letter setting forth the objects of the National Convention of Mayors and Councilmen, to be held at Columbus, Ohio, September 28 to October 1, 1897. It has occurred to the general committee of this convention that a meet-

ing of the comptrollers and auditors of the principal cities of the country, at the same time and place, would not only be of great benefit to the financial officers themselves, but also of much interest to the hundreds of mayors and councilmen who will be at Columbus.

"Undoubtedly your attention has been called many times to the lamentable lack of uniformity among the financial reports of our principal cities, and the consequent impossibility of preparing any definite comparison of receipts, expenditures, etc. We are of the opinion that a meeting of the financial officers of the principal cities of the country could accomplish much toward securing a uniform system of accounts and reports, and that other topics relative to municipal finance could be discussed with profit to all concerned.

"We therefore extend to you a cordial invitation to meet with the National Convention of Mayors and Councilmen at Columbus, September 28 to October 1, for the purpose of participating in a session which will be devoted exclusively to municipal finance."

A large number of financial officials have already responded, announcing their intention of attending the convention. The sessions of the mayors and councilmen's convention will be open to the comptrollers and auditors, and separate meetings are also arranged for them.

#### NATIONAL STREET LIGHTING CONVENTION.

The second annual convention of the National Street Lighting Association will be held at Columbus on the same days as the mayors and councilmen meeting. Inasmuch as street lighting is one of the most important branches of municipal work it is quite appropriate that this association should meet with the mayors and councilmen. The proceedings of the street-lighting convention will be of great interest to the officials attending the other convention, and vice versa. Therefore it has been decided to call the forenoon sessions of the street lighting association an hour earlier, and the afternoon sessions an hour later than those of the mayors and councilmen, thus giving the officials who journey to Columbus an opportunity to attend both meetings. On

the afternoon of Wednesday, September 29, there will be a joint session of both organizations to discuss the subject of street lighting. The experience of the members of the National Street Lighting Association will prove of much interest and value to the mayors and councilmen in their consideration of this important topic.

For the other sessions of the street lighting convention, which will be held in the City Hall, the programme has not been definitely arranged, but there will be a large number of speakers, and every phase of public lighting will be carefully treated. At the opening session an address of welcome will be delivered by Mayor Samuel L. Black, of Columbus, and the response for the association will come from President B. L. Lambert, of New Haven. Among the speakers already announced are E. C. Brown, editor of *The Progressive Age*, New York; Henry A. Knight, superintendent of street lighting, Worcester, Mass., and Felix G. Jacobs, director of public improvements, Columbus.

An important feature of the convention will be "the question box," which will enable all the delegates to ask all kinds of questions regarding street lighting, and receive prompt replies. This furnishes an excellent means for the interchange of knowledge and ideas. A bureau of statistics will be established, and it will have a permanency that will insure the proper compilation and preservation of figures on street lighting in the future. The committee appointed at the last convention to draft constitution and by-laws will report, proposing the following grades of membership: Active, associate, honorary and past. Among the resolutions to be presented will be the following:



B. L. LAMBERT,  
President.



HENRY HOPKINS,  
Secretary.

Resolved, That in the convention of 1898 a gold medal of honor shall be awarded to the person who produces the best artificial light at the lowest cost, or to the inventor of a new system or startling innovation.

Secretary Henry Hopkins, of New Haven, has sent invitations to this convention to the street lighting officials of over six hundred towns and cities, and responses are coming in rapidly from all parts of the country. The attendance will be large and thoroughly representative. An elegant oxidized silver souvenir badge has been prepared for the convention.

The delegates from New England will meet in New York and go from there to Columbus in a body. Their special car will be appropriately decorated, and it will create something of a furore as it rolls into Columbus.

All those who expect to attend the convention should notify Secretary Hopkins, of New Haven, Conn., not later than September 22, and they will be provided with proper credentials. The

#### THE CITY OF COLUMBUS.

CONVENTION CITY OFFERS MANY POINTS OF INTEREST FOR THE ATTENTION OF MUNICIPAL OFFICIALS.

If a Columbus man is asked what are the distinguished advantages of Columbus, he will tell you first of all that it is the geographical centre of the State of Ohio and a great convention city. For so popular has the city become as a meeting place for public gatherings that the entertainment of the countless organizations of varying size and importance that come here for annual meetings has grown into a distinct and important factor of the commercial activity of the city. As a result of the competition between Columbus and other Ohio cities for the entertainment of public gatherings, the business men of the city have, through private subscription, built and equipped a handsome auditorium, with a seating capacity of 10,000, which is given for the use of visiting organizations, entirely free of cost.

Ohio men have a proper, and perhaps a pardonable, liberality



HIGH STREET, COLUMBUS—LOOKING NORTH FROM STATE STREET. 224

same reduced railroads rates made for the National Convention of Mayors and Councilmen from all parts of the country will be extended to the delegates to the street lighting convention.

The officers of the National Street Lighting Association are: President, B. L. Lambert, New Haven, Conn.; vice-presidents, H. A. Knight, Worcester, Mass.; O. E. Greene, Providence, R. I.; E. C. Thompson, Binghamton, N. Y.; treasurer, Joseph Buths, Hartford, Conn.; secretary, Henry Hopkins, Box 912, New Haven, Conn.; executive committee, J. T. Fagan, Portland, Me.; T. E. Gibney, Fall River, Mass.; D. Hunter, Jr., Allegheny, Pa.

—Des Moines, Ia., city warrants, which run from three to eight months and draw 6 per cent. interest, sold on August 3 at one-fourth of 1 per cent. premium. For several years the city has been compelled to defer payment of warrants, and they have been sold sometimes as low as 5 per cent. discount.

of estimation of the greatness of their home State; in the greatness of the galaxy of distinguished men, not a few of them Presidents, who have been born here; in the ingenuity and sweeping popularity of the innumerable "Ohio Ideas" that have been deemed worthy of emulation by other commonwealths; in the material growth of the State, and in its wealth of mineral and agricultural resources; in its rapid advancement in art, manufacture and commerce; in its general progress, and in the forward position it occupies in the sisterhood of State.

So it is not at all surprising that a Columbus man residing in the very midst of all this natural and developed greatness should entertain a flattering opinion of Columbus. Doubtless, if the dissertation proceeds, he will call attention to the fact that Columbus is not only the geographical centre of Ohio, but of the United States. And as the recital grows in warmth and length, it will not be long until the listener is quietly informed that Columbus is really the centre of the universe; the axis around which the civilization, art, commerce, manufacture and

the world's advancement revolves, and that they all grow in progressiveness as they near the centre of motion.

But aside from the Columbus man's views of the city, there is much here to instruct, interest and entertain visitors, and perhaps no city in the country affords so comprehensive and diversified a display of public works and public institutions; such a collection of magnificent State and municipal public, penal and charitable institutions. For this reason the city will present a peculiar attractiveness for the municipal authorities who come to attend the annual convention of mayors and councilmen, to be held here September 28, 29, 30 and October 1.

Columbus has a population conservatively estimated at 135,000. The city covers an area of sixteen square miles, or 10,400 acres. Of this 215 acres are devoted to public parks. They are well cared for, and are made beautiful and inviting places of public recreation. Olentangy Park, which lies in the northern part of the city along the eastern bank of the Scioto River, is one of the prettiest and most picturesque bits of woodland in the State. Minerva Park lies ten miles to the northeast, and covers 150 acres of beautiful natural forest and sward. It is splendidly equipped with all sorts of attractions, and it is reached by an excellent street railway line, and is altogether one of the most attractive and popular resorts known. There parks are maintained and owned by the street railway lines. And in addition to them, there are a number of smaller parks, scattered throughout the city, supported at public expense.

Columbus has 112.29 miles of improved streets, costing in the aggregate over \$5,000,000. Almost, if indeed, not quite all, the different street paving materials known to progressive municipalities are included in their structure. The streets have all been undergoing the wear and tear of the traffic of heavy vans for varying periods, and affords in elaborate and accurate comparison of the relative value of street paving material.

The streets are traversed by several street railway lines, whose aggregate mileage approximates 60 miles. They are underlaid by systems of sewers, comprising nearly every known method of municipal drainage, whose combined lineal measurement is nearly 100 miles. There are laid in the centre of the streets and in the alleys 161 miles of cast-iron water mains, through which the city's water supply is forced by two splendid pumping stations, by a system of direct pressure. The source of supply of these stations is perhaps as dissimilar as it is possible to conceive. The West Side station, the larger of the two, draws its supply from the Scioto River, through a series of filtering galleries; the East Side station draws its supply from a series of artesian wells, which perforate a large and apparently inexhaustible subterranean reservoir at the eastern corporation limits. Both stations are lighted by electricity, and the current is furnished by small dynamos, operated by the same power that drives the pumps, and at a purely nominal cost to the city. The combined daily pumping capacity of the two stations is 53,000,000 gallons. The daily average last year was 12,233,701 gallons.

The rate of mortality in the city is very low. In 1896 the rate per 1,000 population was but 8.75, and in but three other cities of approximate population in the United States was the death rate lower than in Columbus. The city has just embarked upon an era of modern sanitation by which it is expected to largely increase the utility of the department of health, and to lower the mortality still further. In the general plan of betterment is involved the disposal of the city's sewage, which is now discharged into the Scioto River, at some distance below the intake through which the West Side pumping station receives its water supply. The disposal of the city's sewage is perhaps the most vexatious public question the city administration has to deal with, unless it be the provision of an adequate and permanent water supply, for not infrequently the city has suffered great annoyance, and often positive inconvenience, from droughts during which the flow of the Scioto River was scarcely sufficient to meet the city's needs.

On the west side of the city a splendid sewer system is rendered practically useless because of an injunction which restrains the residents of that district of the city from connecting with it

any dry-flow lateral sewers. The sewer in its present legal status is used only as a storm-water sewer. There are two plans of a remedial character now under consideration by the city administration for making this sewer system serviceable, and also for providing a means for the disposal of all the city's sewage, other than by discharging it into the Scioto River. It is contemplated to construct a sewer farm upon the broad filtration plan, upon a piece of ground already purchased by the city for the purpose, to dispose of the sewage by a system of irrigation, designed to enrich and fertilize a vast farm acreage lying south of the city. This somewhat novel, though doubtless entirely practical, scheme is original with the director of public improvements. These two questions, both of incalculable importance to Columbus, will be of engrossing interest to many of the visiting municipal authorities, if in no other manner than in acquainting them with what to avoid in sewerage systems and water supplies.

The city has also in contemplation the construction of a 24-foot dam at a point about nine miles up the Scioto River, where the river banks are formed of high rocky cliffs. This, in itself, will furnish a topic for beneficial investigation and discussion.

The garbage of the city is disposed of at a crematory, located in the southern part of the city, under private contract at a yearly cost of \$15,800. Garbage that may be collected and incinerated under this contract is limited to the solid refuse matter of the kitchen. It is collected weekly or semi-weekly, and transported to the crematory in air and water tight tanks. There it is incinerated and sold for fertilizer. Liquid garbage is not collected, but it is required to be thrown into the sewers. The system has proven to be a very satisfactory one, and has contributed largely, so the superintendent of health says, to the general excellent sanitary condition of the city.

Columbus has also a system of sweeping and sprinkling the streets, adopted and placed in operation two seasons ago, which is inexpensive and in the main satisfactory. The work is done almost entirely by machinery of various designs.

There has been inaugurated a system of competitive bidding in the improvement of streets, which has reduced the cost to a minimum, and guaranteed the perfect condition of the pavements by the contractors for a period of five years after completion.

Recently the fire department has been enlarged by the erection of several modernly built and equipped fire engine houses, and by an addition of a number of pieces of costly fire apparatus, making the department one of the most complete in any city in the country, and effecting as a result a material reduction in insurance rates. The annual inspection of the fire and police departments, which usually occurs during the latter part of August, has been postponed until the latter part of September, especially for the entertainment of the visiting mayors and councilmen.

The city is lighted with electricity by a five years' private contract, partly by underground and partly by overhead systems. The light is not altogether satisfactory to the city administration or to the resident, and there is now pending before council an ordinance providing for the preliminary procedure toward the erection and maintenance of a municipal electric light plant.

The affairs of Columbus are administered under a federal form of government, a system which vests the mayor with an appointive power almost unrestricted, and concentrates the responsibility for the wise and economical administration of the city in his hands. The mayor has a cabinet of four directors, a director of public safety, of public improvements, of law and of accounts, and each of them is the head of their respective department. So much for the municipal features of Columbus and the problems and innovations the administration is considering.

The public buildings, State, county and municipal, and the handsome residences that grace almost every street, the active, progressive business and manufacturing community, and the original and striking evidences of corporate or individual enterprise that abound, form an equally interesting part of the city's make up.

First of all, in gauging the commercial resources and energy of a municipality, the railroad facilities and the business trans-

acted at the post office are perhaps the most accurate and popular basis of estimate.

As a railroad centre Columbus is probably unexcelled west of the Allegheny Mountains. Fifteen railroads centre here, three of which are trunk lines—the Pennsylvania, the Big Four and the Baltimore & Ohio. Almost, if not quite, 140 trains arrive and depart daily. A magnificent new union depot, said to be one of the handsomest in the country, is almost completed. Indeed, the waiting rooms, from an architectural and decorative point of view, are conceded to be the finest in the United States. The Ohio Central depot, a recently built structure on the west side of the city, is also a model of architectural beauty and finish.

The post office is located in the Federal building, an imposing structure near the centre of the city, and with it is quartered the Columbus pension agency, conceded to be the largest and most ably managed pension agency in the country. The Columbus post office, by the way, is also granted to be the foremost in the country in promptness and accuracy of service, and in economy of management. In 1896 the gross receipts were \$292,434.78. The gross expenses were \$151,735, but 52 per cent. of the receipts.

Perhaps the most interesting and massive structure in the city is the State House; certainly so from an artistic point of view. It stands in the centre of a beautiful park in the very centre of the busy city, the purest type of Grecian-Doric architecture in the country. The State penal and charitable institutions are almost uniformly the largest and most renowned in the country. The Ohio Penitentiary is an immense building, almost self-supporting, and the selected prison of the United States Government. Offenders against the United States laws are sent here from all parts of the country, even from the farthest points West and South. The Asylum for Insane is the largest institution of the kind in the world. It has gained a national reputation for the successful treatment for all forms of insanity. Diagonally across the street is the Asylum for Feeble Minded Youth, a handsome building of smaller dimensions. In the eastern part of the city, surrounded by beautiful parks, are the asylums for deaf mutes and for the blind.

The municipal buildings are less pretentious. The Board of Education building, however, is a beautiful structure, and the city morgue, but recently erected and placed in public service, is one of the handsomest and most complete equipped institutions of the kind in the United States. It is patterned after the Chicago morgue, and is, if anything, superior to it in arrangement and equipment.

The Board of Trade building, owned by nearly 600 representative business men, faces the State House, and is a splendid office building. There are, in fact, some of the finest office buildings here to be found anywhere, notably the Wyandotte Building, a fire-proof structure of eleven stories and the new State Journal building, a fire-proof building of eight stories, and now nearing completion.

The hotel facilities of the city have been but recently enlarged by the opening of the new Great Southern Hotel, which went into service as a public entertainer about three weeks ago. This hotel, with the Neil House and the Chittenden Hotel, place Columbus in the foremost rank in the matter of hotels.

But perhaps the most novel evidence of commercial enterprise are the electric arches which span High street, the principal business thoroughfare, for a full mile of distance through the centre of the business community. The arches carry hundreds of incandescent electric lights, which are lighted at sundown and kept burning until midnight. They are placed two to a square, and form a blaze of brightness that is incomparably beautiful in effect. The arches have occasioned more comment, perhaps, than anything in the city, and the idea is being copied in a number of adjacent cities. The merchants whose stores front High street along the district covered by the arches maintain them by private subscription, as an advertisement.

There has never been a convention held in Columbus which has attracted such universal attention, which has so impressed the general public with the distinction of the men who will compose it, or which is thoroughly appreciated for the widespread

influence it will exert toward the improvement of municipal government, as the approaching convention of mayors and councilmen. The city is making elaborate preparations for the entertainment of the visiting municipal authorities. The freedom of the city, to an extent that will be as broad as the mayor is able to make it, will be extended to them, and an entertainment far above that usually provided for public gatherings will be furnished. The city has given the convention its official cognizance, and will support officially and financially every feature of the convention. So, therefore, it is bound to be an unqualified success, and a source of invaluable knowledge to municipal officers that will doubtless result in the general progress and improvement of municipal government and of all things municipal.

### FIRE DEPARTMENT TOOLS.

BY J. A. ARCHIBALD, FIRE MARSHAL, CINCINNATI.\*

Should not tool wagons for carrying extra appliances be adopted in all fire departments, instead of loading the same on fire engines or trucks?

The time-honored custom of carrying tools on fire engines or trucks presents many obstacles.

All experienced firemen will doubtless recall instances where this practice has been a detriment; in addition to taking up too much room on the apparatus, it discommodes the members of the department. Tools carried on the apparatus are also liable to be misplaced while companies are in a hurry to get to work.

My experience with the tool wagon dates to February 19, 1891. Practical experience has taught me that it is necessary to place a time-tried fireman in charge of the tool wagon, as it responds to all alarms in the business portion of the city.

The tool wagon, the one in use in the Cincinnati fire department, is equipped with two, three and four-way siamese with 3 and  $3\frac{1}{2}$ -inch hose, to be used in the event that a large stream is needed.

The wagon should also be equipped with a variety of pipes and nozzles to be used in case of emergency.

In many instances pipes have been lost, and it was only necessary to replace them by going to the tool wagon.

While working at a fire a plug catcher is liable to burst. In such a case, it can be readily seen how advantageous it is to have extra appliances of that kind on the wagon near by. Plug pressure varies according to the locality, and this accounts for a break in one place, while such mishaps do not occur elsewhere.

The tool wagon, in order to avert trouble on this score, should always be supplied with plug catchers of three sizes.

The wagon also carries three sizes of lever jacks, also screw jacks, with wrenches of various sizes.

These attachments come in very handy in the event that a piece of apparatus lets down on the way to the fire.

Prior to the introduction of the tool wagon into the Cincinnati fire department, it has been customary to carry these equipments on trucks, overburdening them to a great extent. These obstacles are now avoided by having every implement needed carried on the wagon, and placed in such a manner that when needed the most in critical times, they are within easy reach.

\* Paper read at the New Haven Convention.

One could go into further details about the many good points of a well-equipped tool wagon. There are a number of small tools and other equipments which are used to good advantage on many occasions.

From what has already been stated above, however, it can be readily seen that the tool wagon has come to stay, and that its adoption in departments is but a question of time.

In conclusion, I desire to state that in my opinion the tool wagon is really indispensable, and that where it should be adopted a short trial will bear me out in the last assertion.

In Cincinnati we consider the tool wagon of almost as much importance as any other piece of apparatus in the service.

#### A BRACE OF ITEMS.

—City officials who attend the Columbus convention will have an opportunity to examine the Miner "Globe" boulevard lamps, used on Broad street, in that city. These lamps, which are made by John G. Miner, of New York, are regarded as models for beauty, strength and durability.

—A peal of four bells, aggregating about 6,000 pounds, is now being made by the Meneely Bell Company, in Troy, N. Y., on the order of John Wanamaker, of Philadelphia. Mr. Wanamaker exercises excellent judgment in all of his business dealings, and he made no mistake in taking his peal order to that city.

#### A WAY OF MAKING HOSE.

It will be of interest to fire department officials to know how wax and gum treated and balance woven fire hose is made. The cylindrical tank shown in Figure 1 contains the compound of melted wax and gum, which is kept in constant assimilation by means of a mixing apparatus revolved by the shaft seen at the top of tank. By

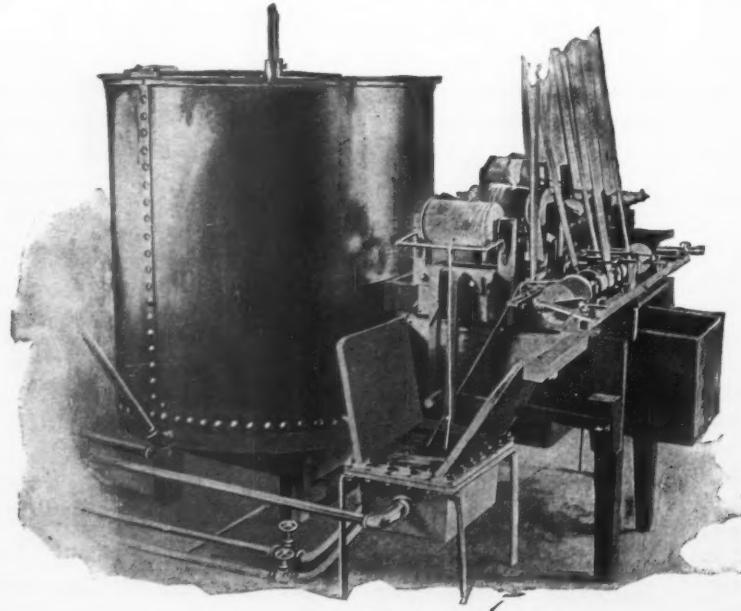


FIG. 1. 225

means of steam pipes within the tank the treatment is kept in a fluid state, and is conducted by means of pipes to the small square tank shown in the illustration at the bottom to the right. This constitutes what might be termed a bath tub, and to this tank the white cotton yarn in its original state is conducted from the large spool

which may be seen at the top of the frame. These strands when they reach this bath of wax and gum run over a series of pulleys that are completely immersed by the treatment. The strands, after going through this bath slowly, become practically a collection of waxed ends, and they run thence to a large spool to the right. These spools of treated yarn are then mounted on the warp frames and shuttles of the looms, and are woven into the fabric.

Fig. 2 is a transverse section of a piece of hose con-



FIG. 2. 226

structed on the balanced weave principle. Fig. 3 is a face view of a portion of the hose projected on a plane, and representing it with a portion of the outer plies removed to show the inner threads. *i i* represent the warp threads of the inner ply; *o o* are the warp threads of the outer ply; *w w* are the weft threads of the outer ply, and *w' w'* are the weft threads of the inner ply; *l l* are the locking threads of the warp, passing through both plies and securing the two together (represented in Fig. 3 by shaded lines), thus producing a so-called solid woven hose. By dropping the tying cords a superior

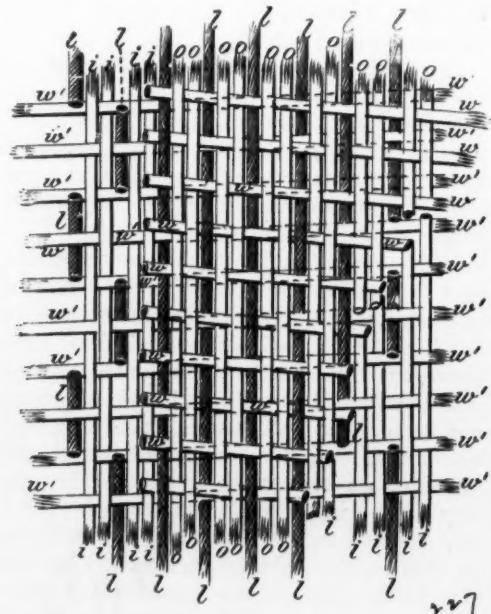


FIG. 3. 227

hose is produced, made up of two or more independent jackets.

It will be seen by referring to Fig. 3 that the threads *w w* of the outer weft and those of the inner weft run in opposite spiral directions, thus producing the balance woven hose.

## PRESIDENT JOHN CAULFIELD.

Here is a fair likeness of John Caulfield, president of the American Water Works Association and secretary of the board of water commissioners of St. Paul. Mr. Caulfield has been connected with the water department of the city of St. Paul for so many years that he is now regarded by the people of that city as an indispensable part of the works. He has also been a member of the American Water Works Association for a great many years, and the delegates to the Denver convention elected no stranger to the presidency. Mr. Caulfield is known as a thoroughly competent and efficient

water works man from one end of the country to the other. During ten years of daily newspaper service in St. Paul, the writer of these lines became intimately acquainted with Mr. Caulfield, who was always a courteous and genial gentleman, and a careful and conscientious public official.

## DIRECTOR OF PUBLIC WORKS BEECHER.

Several months ago, when the new charter of New Haven, Conn., abolished the board of public works and substituted in its place a single commissioner, Mayor Farnsworth again displayed his good judgment in making an appointment. For director of public works he selected William S. Beecher, one of the representative and public-spirited citizens of New Haven; a straightforward, practical business man.

Much will be expected of Mr. Beecher in his new position, and he is not the man to cause disappointment. His appointment has given general satisfaction. Mr. Beecher is a stockholder of the Diamond

W. M. S. BEECHER, 230  
Director of Public Works, New Haven,  
Conn.

Match Company, and represented his senatorial district in the last session of the general assembly of the State of Connecticut.



JOHN CAULFIELD,  
St. Paul. 228

## CHIEF OF POLICE KELLY, OF COLUMBUS.

This portrait introduces to our readers Mr. Patrick Kelly, the efficient chief of police of Columbus, Ohio. The mayors and aldermen from all parts of the country who attend the Columbus convention this month will find

that Chief Kelly heads a police force which is deserving of much praise for its courteous attention to strangers and its effective work in protecting life and property and preserving the peace of the community. During the convention the annual parade and inspection of the police force will occur, and this will doubtless prove a very pleasant and interesting event for the city's visitors. Of Chief Kelly, personally, we can say that he is a genial, quick-witted and courteous gentleman. We feel quite sure that he would rather lose his good right arm than "pinch" any of the convention visitors, so for the sake of the chief's physical perfection let us "be good" while we are at Columbus.

water works man from one end of the country to the other. During ten years of daily newspaper service in St. Paul, the writer of these lines became intimately acquainted with Mr. Caulfield, who was always a courteous and genial gentleman, and a careful and conscientious public official.

## BOSTON WATER REPORT.

Water Commissioner Murphy, of Boston, has submitted to Mayor Quincy his report for the year ended January 31, 1897. The report shows receipts and expenditures as follows:

## RECEIPTS.

Income from sales of water.....	\$2,437,320.76
Income from shutting off and letting on water, and fees .....	6,155.53
Elevator, fire and service pipes, sale of old material, etc.....	54,826.10
	<hr/>
Total receipts.....	\$2,498,302.39
Less refunded water rates.....	1,666.06
	<hr/>
Net receipts.....	\$2,496,636.33

## EXPENDITURES.

Current expenses.....	\$591,550.42
Interest on funded debt.....	878,379.98
Sinking fund requirements, 1895-96.....	194,740.00
Extension of mains, etc.....	232,142.98
Amount paid Chelsea, Somerville and Everett under contracts.....	172,527.82
Damages for maintaining Mystic sewer filtering beds .....	11,666.00
Balance to general revenue account of city.....	415,629.13
	<hr/>
Total .....	\$2,496,636.33

## PAVEMENT FROM WASTE COAL ASHES.

Conspicuous among the features of the Columbus convention will be the exhibition of a street paving material which has all the merits and none of the faults of asphalt. This new and interesting material is the invention of Mr. George F. Averill, of New York, who has spent many years of scientific study on its perfection. A street pavement that will cost less and can be guaranteed double or triple the life of an asphalt pavement, which Mr. Averill claims he is now able to construct from his material, is something that will readily command universal attention. A block of this new pavement will be laid on a street in Columbus during the mayors and councilmen's convention, so that the hundreds of city officials who will be there from all parts of the country may observe its method of construction, which is a revelation in simplicity and rapidity. The reports of disinterested experts who have made scientific crushing, abrasion, absorption and chemical tests of the material will be presented at the convention, and to satisfy the most skeptical these reports will come from civil engineers and analytical chemists whose high standing cannot be questioned. Mr. Averill promises to demonstrate to the officials present at the convention that his pavement surpasses all others in facility of construction and repair, in strength and durability, in ease of traction, in sanitary qualities, and in economy.

Probably the most interesting and startling fact about this new paving material is that it is made principally from coal ashes, crushed rock, sand or iron slag. Either one or a combination of any of these common materials can be utilized in making the pavement, of which only about 20 per cent. of the whole is of the peculiar cement invented by Mr. Averill. That such a waste as coal ashes, for instance, can be made to compose 80 per cent. of a strong, durable and sanitary street pavement will be a revelation to those towns and cities which have ever been burdened with the expense of carting away and disposing of this refuse. That the cobbles and granite blocks of old, uneven and unhealthy pavements can be ground up and utilized in the construction of a smooth and perfect roadway is a fact that city officials and property owners who are inclined to be economical will be eager to learn. That the superfluous iron slag of a city like Pittsburg, for instance, has a value as a material for the construction of pavements that will bear the heaviest possible traffic is a matter of no little moment. That our towns and counties can build beautiful and substantial streets and roads from sharp gravel is another item of importance. The Averill process, indeed, promises to revolutionize the business of street paving.

The Averill pavement can be constructed either in the block or sheet form, the latter being preferable in most cases. Several paving blocks made from Mr. Averill's composition and coal ashes can now be seen in the CITY GOVERNMENT office. These blocks stand a crushing test of over 20,000 pounds to the square inch; a fire test of over 2,000 degrees, not cracking when thrown while in a white heat into water; an absorption test of about three-fourths of 1 per cent. in thirty hours, and an abrasion test of 1.5 per cent. in rumble with 400 pounds of cast iron for one-half hour. The same material in sheet form will, of course, stand nearly the same test.

The method of laying a sheet pavement of the Averill material is very simple. After the necessary excavation is made, the mixed material, which requires no heating, as asphalt does, is spread upon the ground to a thickness of from 2 to 3 inches. This will be thoroughly set within twelve hours, and then another layer is spread on top, and rolled with a steam roller. The two layers weld absolutely, making one solid mass of from 4 to 8 inches in thickness, which may be thrown open to traffic within twelve hours after it is finished. The pavement can be made to stand a crushing test of from 5,000 to 15,000 pounds to the square inch, according to mixture and thickness. The surface, while smooth and even, has not that slipperiness which makes an asphalt pavement objectionable. The strength of the pavement is so great that it will hold up any traffic, even if the ground underneath falls away in places.

Mr. Averill claims another advantage for his pavement, and that is its availability for streets with steep grades, and for dock fronts, where a strong foothold is required for horses. The pavement can be laid with toe-calk holes, something impossible with asphalt. The pavement will not soften from heat nor harden from cold, thus avoiding expansion and contraction. The material is a non-conductor of frost, cold, heat and electricity, and, after hardening, it is non-adhesive.

As the pavement neither expands nor contracts it holds its bind perfectly when laid against street car rails, making the street car traffic comparatively noiseless. The same particular virtue is claimed for the material when used for filling in manhole covers.

No heating apparatus, no mixing machines and no expert workmen are required to repair this pavement. When the street has been dug into for any purpose (and it can be taken up as easily as asphalt) the hole in the pavement can be quickly and easily filled by any ordinary workman. All that is necessary is to mix the required amount of new material with a hoe, dump it into the hole and level it off. The new material adheres to the old, and within a few hours the weld is as absolutely as strong as is the old pavement, and the roadway is thoroughly repaired. This is a matter of much importance, especially to the smaller cities which have refused to adopt asphalt paving on account of the trouble and expense of repairs.

A very important advantage of the Averill method of construction is that it admits no possibility of sinkholes, caused by the falling away or disintegration of any part of a foundation. The actual foundation of the Averill pavement is the whole thickness laid, which is of sufficient strength to hold up the heaviest possible traffic. The absence of sinkholes in a street pavement will be appreciated by wheelmen and drivers alike, who have always suffered from the numerous ruts and holes that soon appear in all roadways improved with any of the materials now in common use. It will be readily seen that the whole thickness of this pavement also serves as the wearing surface, as there is no top sheet to be worn away within five, ten, fifteen or even twenty years. It is claimed that this pavement will wear indefinitely. Expert consulting engineers assert that a 2-inch thickness of the Averill material, that has a crushing strength of 10,000 pounds to the square inch, has sufficient strength to carry any traffic in the world. With the feasibility of toe-calk holes smooth pavements can be had for dock fronts and railroad approaches, whereas asphalt paving cannot be utilized for such places, and much heavier and larger loads can be drawn with less wear and tear than over Belgian blocks.

The Averill material has the same advantages for the construction of curbing, sidewalks and sewers as it has for roadways, and the nature of its composition, requiring no heating, but being used with a trowel in the same manner as cement, makes its use for these other purposes decidedly convenient.

Cities and towns already provided with rock crushers and rollers need only to add a pulverizer and a mixer, which costs less than \$1,000, to have a complete plant for laying Averill pavements, a fact of considerable importance to those municipalities which prefer to do their own work than to letting it by contract.

## CITY GAS INSPECTOR.

The council of Kansas City, Mo., has passed an ordinance providing for a city gas inspector who will be required to test the candle power of all gas sold to the city. He will also inspect meters at the demand of the consumers. If the consumer asks to have his meter tested he must deposit \$1 to pay for the test. If the meter be found incorrect the fee will be returned to him, but if it be found correct the complainant forfeits his \$1 to the gas company. The gas company must pay for the cost of the inspection bureau, salaries and all. The mayor and council will have the appointing of the inspector.

### AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS.

BY D. L. FULTON, SECRETARY.

In the spring of 1894 Mr. M. J. Murphy, street commissioner of the city of St. Louis, Mo., communicated with the mayors, city engineers and directors of public works of many of our large cities, with the end in view of forming a society for the exchange of ideas and discussion of the most improved methods of conducting municipal work, more especially that part in charge of the city engineers and directors of public works. The tone of the answers he received seemed to indicate that such a society had become a necessity, and that the city of Buffalo was the most central point for all concerned at which to hold the first meeting. The city council of Buffalo made an appropriation for the entertainment of delegates

On September 11, 1895, the society met in the city of Cincinnati, and found the local committee had left no stone unturned to put the organization on a solid footing. Invitations had been extended to the city officials of all cities of this country and Canada of 5,000 and over to send delegates; forty-eight cities responded with about one hundred and fifty delegates, besides many visitors who came in an unofficial capacity. President Murphy, having resigned his official position, tendered his resignation to the society, which, under the circumstances, was accepted. First Vice-President Benzenberg took the chair. It would take too much space to more than mention the names of the papers read at this convention, which were as follows:

"Quality of Water Supply," by John W. Hill, C. E., Cincinnati, Ohio.

"Specifications for Vitrified Brick Paving," by W. G. Wilkins, C. E., Allegheny, Pa.



AUGUST HERRMANN, CINCINNATI, PRESIDENT. 23 /

to this first convention, and appointed a local committee to look after their wants.

On the 19th of September there assembled in Buffalo about sixty delegates from seventeen cities of the country, and organized the American Society of Municipal Improvements, with the following officers: M. J. Murphy, of St. Louis, president; George H. Benzenberg, of Milwaukee, first vice-president; George S. Gatchell, of Buffalo, second vice-president; A. Joralemon, of Newark, treasurer, and D. L. Fulton, of Allegheny, secretary.

A number of subjects were discussed in an informal way, a paper of considerable length was read by August Herrmann, president of the board of administration of Cincinnati, on the subject of their purchasing agency, showing a saving of from 10 to 30 per cent. in the purchase of all their supplies. A constitution and a set of by-laws were adopted, and the society decided to meet the following year in the city of Cincinnati.



JOHN L. KENNEDY, NASHVILLE, TREASURER. 23 ✓

"Water Supply of Newark," by Henry E. Bailey, C. E., commissioner public works, Newark, N. J.

"Street and Sewer Work of Indianapolis," by W. B. Holton, chairman board public works, Indianapolis, Ind.

"General Government of Toronto, Can.," by Mr. Blevins, Toronto, Can.

"Collection and Disposal of Garbage," by Thomas E. De Vilbiss, director department public works, Fort Wayne, Ind.

"Street Paving in Newark," by Harrison Van Duyne, president board public works, Newark, N. J.

"School Hygiene," by Dr. M. E. Donahue, Cincinnati, Ohio.

"Street Cleaning, Street Watering, Scavenging, Etc.," by John Jones, street commissioner, Toronto, Can.

"Street Cleaning in Newark," by H. E. Bailey, commissioner, Newark, N. J.

"Electrolysis Prevention," by Harold P. Brown, consulting engineer, Newark, N. J.

All of these papers were freely discussed in all their phases. The local committee on entertainment provided means for viewing the city, with its many points of in-

terest. Badges of the delegates entitled them to free passage on the street cars, as well as use of the long-distance telephone. A fine display was made by the police and fire departments. The last evening's entertainment was an elegant banquet, at Cincinnati's finest hotel, to all the delegates.

From a business point of view this meeting was a great success, and all the delegates felt as if they had gotten some new ideas to put into practice when they returned to their respective cities. After making some changes in the constitution, electing new officers and selecting a place for holding the next convention, the society adjourned.

On October 14, 1896, the society met in the city of Chicago for the transaction of its business. Sixty-four cities responded with over 200 delegates, all anxious to get to work and learn all possible from the papers to be read and from the discussions which followed each paper. Standing committees had been appointed on the following subjects: Street paving, electric street lighting, sewerage and sanitation, waterworks and

"Regulations Concerning the Openings in Pavements by Corporations and Plumbers in the City of Washington, D. C.," by Capt. Lansing H. Beach, Washington, D. C.

"Excavations in City Streets," by George D. Snyder, city engineer, Williamsport, Pa.

"Improved Streets and Care of Same," by M. A. Downing, chairman board public works, Indianapolis, Ind.

"Subject Upon the Noise of Brick Pavements," by Ernest Adam, engineer of street and sewer department, Newark, N. J.

"Repairs to Asphalt Pavements, Based on Experience in Buffalo, N. Y.," by E. Guthrie, chief engineer, Buffalo, N. Y.

"Specifications for Asphaltic Mixtures and Tests for Same," by A. W. Dow, Washington, D. C.

"Municipal Control and Inspection of Electrical Construction in Cincinnati," by John A. Cabot, city electrician, Cincinnati, Ohio.

"The Construction of Pipe Sewers at Washington to Prevent Root Intrusion," by Capt. Lansing H. Beach, Washington, D. C.

"Sewers and Sewage Disposal of Chicago," by G. L. Clausen, superintendent bureau of sewers, Chicago, Ill.

"The Water Supply of Eight Cities in Relation to Typhoid Fever Rates," by John W. Hill, C. E., Cincinnati, Ohio.

"Water Supply," by John L. Kennedy, board public works, Nashville, Tenn.

"Some Features of the Brooklyn Water Supply, as Presented



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water supply, taxation and assessments, city government and legislation, disposition of garbage and street cleaning review. Special committees: Coating of cast-iron and riveted steel pipes, electrolysis, and abolishing of railroad crossings in cities.

The following papers were read and freely discussed by all interested delegates:

"The Need of a Laboratory for the Testing of Asphalt Pavements," by Nelson P. Lewis, engineer of street construction, Brooklyn, N. Y.

"Paving Streets with Brick," by S. J. Hathaway, president of councils, Marietta, Ohio.

"Paving in Nashville," by J. L. Kennedy, member board public works, Nashville, Tenn.

"Modern Street Railway Construction on Asphalt Paved Streets," by F. W. Cappeln, city engineer, Minneapolis, Minn.

"Testing Paving Brick," by A. D. Thompson, city engineer, Peoria, Ill.

"Street Paving in Syracuse," by Robert Ballard, member board public works, Syracuse, N. Y.

by I. M. De Verona, Engineer of Water Supply," rearranged by M. R. Sherrerd, engineer water department, Newark, N. J.

"Investigation of Quality of Water for Public Use," by A. S. Tuttle, assistant engineer of bureau of water, Brooklyn, N. Y.

"Outages," by J. A. Cabot, city electrician, Cincinnati, Ohio.

"Newark's Gravity Supply and Steel Conduits," by M. R. Sherrerd, engineer water department, Newark, N. J.

"Municipal Government," by John L. Kennedy, board public works, Nashville, Tenn.

"The Collection and Disposal of Garbage in Milwaukee," by Walter Dempster, M. D., commissioner of health, Milwaukee, Wis.

A perusal of the foregoing list will convince anyone at a glance that the hearing of these papers read and the discussion which follows each cannot but increase the knowledge which any public official needs in the carrying on of his work. Besides the discussion of the papers there is that intercourse of the officials of the different cities in a business and social way that always tends to increase an official's efficiency.

There is always one point about these conventions, and that is that when a city once sends a representative to them they need no invitation for the next year, for their officials always gain enough information to pay them to send more delegates the next year.

It is the desire of the officials of this society that all cities which are making or contemplating making any improvements on their streets or sewers, or, in fact, in any branch of the public works department, send some of their officials this year to Nashville, Tenn., October 5 to 9.

Then there is the Tennessee Centennial, which is a gigantic affair, and should receive the support of all patriotic Americans. There might be written pages about this centennial, and then not tell all that there is to be seen. It is said to be a good miniature of the World's Fair, which many of us did not have time to do justice to.

The list of papers for the coming convention has not been completed yet, but we are assured by the officials who have them in charge that they will be equal to or even better than those we have had in the past. Many men of national prominence are at work on subjects of which they are masters to present at our next convention.

The governor of Tennessee has kindly given the hall of the house of representatives of the magnificent state capitol to hold the sessions of the convention in. The sessions will be arranged so that delegates may have an opportunity to visit the centennial and still transact business.

The city engineers and directors of public works of all our cities should make a special effort to attend this convention, and after attending one, they will need no second invitation as long as they remain city officials.

#### SUCCESS OF THE METER SYSTEM.

The benefits to be derived from the use of water meters have been strongly demonstrated by the experiments just made at Richmond, Va. The results of this experiment are set forth in the following report made by Charles E. Boiling, superintendent of the waterworks:

I submit this report of results given from the placing of 300 water meters, recently put in, 284 of which are in use, and from which we get the following information: Thirty-five houses (12 per cent.) used less than 1,000 gallons of water per month; 77 houses (27 per cent.) used between 1,000 and 3,000 gallons per month; 119 houses (42 per cent.) used over 4,500 gallons per month, and 130 houses (45 per cent.) would have bills a little lower by the meter than by ordinance rates. The extreme cases were: One house consumed 105 gallons per month, about three gallons per day; the other having only one hydrant and one closet, consumed 145,638 gallons. Many leaks in pipes and fixtures were discovered, which otherwise would never have come to light, besides the checking of hydrants and closets, which were constantly left running and wasting. In every instance where leaking pipes and fixtures were found notices were left, and the consumers notified that if this continued high bills would be the result. All these examinations and notices were made prior to commencing the charge for water by the meter, so that everyone upon whose pipe a meter was placed would have full opportunity and time to correct all leaks.

The fact that 35 houses out of 282 used less than 1,000 gallons per month seems to me to clearly establish the necessity of fixing a minimum quantity of water to be used at each premise,

which is the general custom in all cities which have adopted the meter system, otherwise premises will not be kept clean. This can be easily accomplished by fixing such an amount as will not exceed the present charge by ordinance. Our ordinance rates are as low as those of any city in the United States for such fixtures as are absolutely necessary for each lot—namely, a hydrant and closet. Our watertakers average about 10,000; our annual interest on the debt and cost of maintenance amounts to about \$67,000; this would make an average charge to each consumer of \$6.70 per annum for actual cost; and, adding \$1.30 for sinking fund, to meet redemption of bonds at maturity, the amount would be \$8 per annum—67 cents per month—a tax within the means of nearly every man. At the rate of 15 cents per 1,000 gallons, this would entitle each consumer to 4,500 gallons of water per month, a quantity amply sufficient for domestic and sanitary use.

The much-desired benefit of increased pressure is gradually being established, and many persons are now getting water to the fixtures on the second floor who have had none during the daytime for some years. In the high points in Madison Ward, north of Broad, where there has been much just complaint, water will rise 11 3/4 feet higher than it would in the month of August, 1895, and 5 8-10 feet higher than at this time last year. To no other cause can this be ascribed than the checking of waste by placing meters, for the water in the reservoir is kept exactly at the height it was in those months, and no larger supply mains have been laid.

I anticipate still further increase in the pressure before the end of the year, as it will improve as we continue to set the meters.

#### PUBLIC LIGHTING.

—The report of the Jacksonville, Fla., municipal electric light plant for July shows that the receipts for commercial lighting amounted to \$2,745.86, of which \$575.75 was net profit. The number of lights in use were: Incandescents—Commercial, 8,002; incandescents, police station, etc, 603; total, 8,605. Arcs—All night, street, 120; all night, commercial, 23; 12 o'clock, commercial, 93; city hall and armories, 31; total, 267.

—A new street lighting contract has just been made at Northampton, Mass. The contract calls for 149 or more arc lights of 1,200 standard or about 800 actual candle-power, part to burn all night and part until midnight. For each all-night light \$100 is fixed as the price, and for the lights burning until midnight \$67.50. For the incandescent lights of 25 candle-power each the sum of \$22.50 is to be paid annually.

—An exhibition of Welsbach street gas lights was recently given at Syracuse, N. Y. The lamps were placed along several blocks of Onondaga street, about 100 feet apart, and alternately on either side of the street. Syracuse has something of a reputation as a well-lighted city, an excellent arc electric system being in use. This exhibition, therefore, brought the arc electric and Welsbach gas systems into conspicuous comparison, with the result that the Welsbach lamp seemed to give a more even distribution of light, the intense glare of electric lamps at street intersections and the shadow cast by the foliage of trees being eliminated.

—An ordinance has been introduced in the council at Houston, Tex., granting the Houston Gas Company the right to extend its system, replace and repair its pipes at any time, and granting the company an extension of its franchise for a period of thirty years, provided it fix the price of \$1.80 per thousand and furnish 18-candle-power gas. The franchise is not exclusive. The ordinance also provides that in making connection with consumers only the actual cost of making such connection be charged, with an addition of 10 per cent.; that no charge be made for meters, etc. The ordinance apparently gives the gas company the right to charge \$1.80 per thousand for the next thirty years.

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*Municipal news and information regarding changes of city officials will be greatly appreciated.*

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### NOTE AND COMMENT.

Trinidad Lake asphalt at \$1.19 per square yard is what the property owners along Jefferson avenue, Saginaw, Mich., will get as a result of the fight which the Alcatraz Company is making against the Barber combine. The job was advertised three different times. The first letting was declared illegal by the courts. On the second proposal the board of public works recommended to let the contract to the Barber Company, but the council refused to approve of this action because the bid of the Alcatraz people was the lowest. On the third advertisement the Barber combine, realizing the fact that nothing but the lowest figure would capture the contract, put in a bid of \$1.19 per square yard, and secured the job. The first bid of the Barber people was \$1.99 and the second \$1.48. In the comparatively few cities which still adhere to the suspicious practice of specifying for the benefit of the Trinidad-Bermudez combine, no such figure as \$1.19 can be obtained on asphalt paving. It is in cities like Saginaw, where the officials have broken away from the monopolistic specifications, that the property owners will secure the benefit of free and open competition.

The sincerity and veracity of the Trinidad-Bermudez Asphalt Trust must, indeed, command respect since recent developments at Washington, D. C. By act of Congress the maximum price for asphalt paving in Washington is fixed at \$1.80. When it was proposed to place a duty of \$3 a ton on refined asphalt and \$1.50 a ton on crude asphalt the trust people told the lawmakers that such a tariff would be a tax on property owners because the Washington maximum would have to be raised. At the first letting after the tariff bill was passed, and after the above mentioned tax had been placed on refined and crude asphalt, the city of Washington received a bid of \$1.56 from the trust.

Rochester, N. Y., is the latest city to break away from the grasp of the asphalt trust. The daily newspapers of Rochester have been reprinting the comments that CITY GOVERNMENT has made relative to free and open competition for paving work, and the result is that the property owners on West Main street, when they petitioned for an asphalt pavement, asked that no particular kind of asphalt be specified.

The financial report of the Chicago board of education shows that the expenditures last year amounted to nearly \$7,000,000. The total amount paid for salaries was \$4,477,342. Teachers of fads drew salaries to the following amounts: Drawing, \$17,324; music, \$21,329; German, \$135,167; physical culture, \$10,134; kindergartens, \$39,085. For school sites the expenditure was \$51,190, and for erection of new buildings \$1,003,973. The architect's department cost \$26,585, of which more than \$24,000 was for salaries. The rental of stores for schools and rooms for offices cost \$94,906. Other important items of expense were: Fuel, \$147,136; school supplies, \$50,136; high schools, \$396,530; normal school, \$59,371; evening schools, \$67,399; compulsory education department, \$15,548.

Mayor Hooper, of Baltimore, in a recent interview said: "I do not speak from the standpoint of an expert, but, in my opinion, it has not been demonstrated that asphalt is the best pavement. It seems to me that the pavement of the future will be of granite blocks on a concrete base, the blocks being so dressed and laid as to prevent edges being exposed, and really furnishing a smooth pavement. This would not be worn down by heavy traffic, while for more comfortable pleasure driving rubber tires would fill the bill. Pavement of this character would be more expensive than what we now have, but it would probably be the cheapest in the end."

City Engineer Wise, of Kansas City, Mo., in his annual report shows that there was an increase of 45 per cent. in the public improvements in 1896 over the previous year. The total outlay for paving and other improvements during the year amounted to \$827,666. The city has over 100 miles of paved streets. There are 35.48 miles paved with asphalt, 21.15 miles with cedar block, 20.17 with macadam, 18.70 with brick and 2.12 with granite.

### THREE SETTLED POINTS PERTAINING TO THE OWNERSHIP AND OPERATION OF PUBLIC SERVICE INDUSTRIES.

BY ALLEN RIPLEY FOOTE.\*

The relative advantages of private and public ownership and operation of public service industries have been the subject of much discussion for many years. Large numbers of excellent citizens—moved thereto by various motives—have felt impelled to organize themselves into associations for the purpose of promoting the development of some special municipal function or service, or to exercise a general paternal supervision over the welfare of their municipal homes. In New Orleans there is a "Municipal Improvement Association," in Chicago a "Civic Federation," in New York, an "Association for the Public Control of Franchises," in Boston a "Committee on Municipal Ownership"; in short, in a majority of cities or towns throughout the country there is an organization having for its object the improvement of some special phase of municipal conditions or the general betterment of municipal government. In addition to these manifestations of individual interest there are probably 5,000 publications issued daily, weekly, monthly or quarterly, that advocate, more or less completely, the principle of municipal ownership and operation of all public service industries, and continually urge its adoption as a settled public policy by all municipalities in which they have a circulation; of argument and sentimental and theoretical discussion there has been an abundance.

Although there are many examples of the municipal ownership of water works and electric-lighting plants and of a few gas works, no authoritative investigation to establish the facts of experience has been undertaken. "Studies" have been made by individuals, Committees of City Councils, of economic associations, and of quasi-political organizations have made incomplete and superficial "investigations," but nowhere does there exist information collected, tabulated and published by an authority competent to act with judicial fairness and equipped to make a complete survey of the entire field. Comprehensive, all inclusive, statistics of public service industries do not exist in a form that can be used for the purpose of fair and reliable comparisons for the guidance of legislative action, or the formation of correct opinion. The only points, therefore, that have been argued to a conclusive acceptance by both sides to the controversy pertain to the principles applied in methods of procedure rather than to the purely economic results of ownership and operation.

When first undertaking the discussion of this subject I was frequently hampered by failing to find sources of complete information as to its legal or economic aspect. At very great expense, and after years of labor, with the aid of a competent attorney in each of the forty-four States, I succeeded in making a compilation of the legislation and court decisions of every State and Territory

and of the United States courts. I published this work in proper form to present a complete statement of the law governing corporations operating under municipal franchises. (1) I wrote an introduction for this compilation in which I briefly discussed the economic principles involved in the laws and decisions under consideration. I attempted to deal with the subject in a manner essentially different from the methods employed by others. I sought to elucidate principles and clearly to define strategic points in order to measure by fundamental rules the progress made by the several States in aligning legislation with the requirements of such rules. My purpose was to outline the subject in a way to induce others to engage in an exhaustive discussion of the fundamental principles upon which municipal, political and industrial corporations must be founded, if citizens of municipalities are to enjoy the greatest obtainable advantages from the use of modern municipal conveniences. I found I could not properly discuss the subject without considering the effects on the production and distribution of wealth of private property and free exchange, in comparison with State property and regulated contracts.

This was essential because no general question of governmental policy occupies at this time so prominent a place in the thoughts of the people as that of properly controlling, without unnecessarily checking, the growth of corporate power. I clearly saw, since citizens of municipalities are closely in touch with corporations operating under municipal franchises, that the legislation of municipal councils and of State Legislatures would readily respond to clearly defined demands, and that such corporations would naturally receive a large share of public attention. It follows as a logical result that the generally accepted policy of municipalities and of States for regulating and controlling municipal franchise corporations will surely become the foundation of a national policy for the regulation and control of interstate and national undertakings. The rapid growth of urban populations, inducing and requiring the multiplication of municipal advantages and conveniences, has forced problems of the utmost urgency and of fundamental importance upon the attention of society. These questions are claiming the best thought of a majority of intelligent persons in all progressive countries.

The most difficult task of future legislators, in city councils and State assemblies, will be to correct the errors of the past. That this may be properly done, discussion of the subject must be intelligent and comprehensive. A full knowledge of present conditions, both as to the law and the economic facts of experience, must be acquired. Opportunity for knowing the law is furnished in the work mentioned. The work of obtaining the statistical records of experience is now in progress by the United States Department of Labor.

#### NATURAL MONOPOLIES.

One point on which I believe all intelligent advocates on both sides of the question are in agreement is that the nature of the business of a public service corporation, whether it be political or industrial, requires that it shall

\*Author of:  
"Economic Value of Electric Light and Power."  
"The Law of Incorporated Companies Operating Under Municipal Franchises."  
"The Money of the Constitution."

(1) *The Law of Incorporated Companies Operating under Municipal Franchises.* Robert Clarke Co., Cincinnati, Ohio.

be carried on as an exclusive and perpetual monopoly. This is a plain requirement of natural economic law. A municipal service, whatever its character, can be most effectively rendered when administered as an undivided interest for the whole municipality. The principles of competition do not apply to the services of supplying water, of generating and distributing means of supplying light, heat and power, or of intra-municipal transportation for persons and commodities, any more properly than it applies to the services of administration performed by a mayor and his staff of assistants, a chief of police and the force under his command, a chief of a fire department and the men who work under his direction. Duplication in these last named services would be as unintelligent a way in which to promote efficiency and serve the best interests of the people as it has been in the case of industrial services. No one proposes a competing mayor, a competing police force, or a competing fire department as a means of improving or cheapening municipal administration or services in these particulars. Neither should there be anyone to propose a competing water works, gas works, electrical plant, or street railway as a means of improving or cheapening administration or service in such industries. It is because laws and ordinances have been enacted in conformity with a popular delusion that the creation of a monopoly is contrary to a correct public policy, instead of in conformity with the requirements of the principles of natural economic law, that so much antagonism exists between the people and corporations rendering these services. Legislators have acted on the false conception that it was their duty to prevent the creation of a monopoly when they should have recognized these industries as existing natural monopolies, and enacted laws for their proper regulation.

Prof. Richard T. Ely says:

There are various undertakings which are monopolies by virtue of their own inherent properties. \* \* \* They are railways, telegraphs, telephones, canals, irrigation works, harbors, gas works, street car lines and the like. Experience and deductive argument alike show that in business of this kind there can be no competition, and that all appearances which resemble competition are simply temporary and illusory. \* \* \* A single city like Baltimore has easily wasted \$10,000,000 in attempted competition in the gas business.

Any intelligent observer who carefully examines the exhibit of the legislation and court decisions of all States to which reference has been made cannot fail to be impressed with the grave errors that have been made, caused by the failure of legislators, municipal and State, and of judges, to recognize the industries under consideration as natural monopolies. Nearly if not all of the evils chargeable to privately owned and operated public service industries are the result of misfit legislation. The statutes may be searched in vain for a definition of the word "monopoly" that will align itself with the economic requirements of natural monopolies. There is nothing in these laws to show that, in enacting legislation pertaining to supplies for municipal needs, any attempt has been made to align the enacted law with its correct principle of natural economic law. As a result, false standards have been adopted which have caused losses instead of

gains for the people. Misfit legislation creates the class of monopolies to which correct legislation is opposed.

It may be affirmed as a fundamental economic principle for the guidance of legislation that no public need should be supplied under the management of a political monopoly, that can be supplied *with equal economic advantage to the users of the service*, under the management of an industrial monopoly. *The best interest of the users of the service should be the first object of the protection and care of the State and of the municipality.* All municipal industrial needs must be supplied by municipal monopolies if the services are to be rendered to the best economic advantage. They must be managed as a municipal unit if they are to be capable of accomplishing the greatest public good. These conditions are fundamental. A comparison of these purely natural economic conditions with the laws of all States will quickly show how unintelligently well-meant efforts have been directed in all attempts properly to secure for public and private users the services supplied by industrial corporations on the best economic terms.

NATURAL MONOPOLIES SHOULD BE CONTROLLED BY THE STATE.

The State is the creator and therefore the sovereign of municipal, political and industrial corporations. The controlling power must be superior to the interests to be controlled. The fundamental powers of a State are required to safe-guard political and industrial equity between its citizens, or the groups of citizens that are created legal persons by its authority. This safe-guarding necessarily requires judicial and impartial relations to the subject of control. Such relations can exist only where the controlling power has no interest in the subject of control, either as a beneficiary, an owner, or a user of its services.

Power to control measures the duty to control. That State control may be impartial and capable, the officers of the State must acquire complete and accurate knowledge of all details. This requirement renders it necessary that every set of public service accounts shall be kept by a uniform system, that similar items shall always be entered under specified headings, and that uniform reports shall be made covering the operations of the same periods. When provided with such data the State will be able to show the inhabitants of any municipality, or the managers of any industrial corporation, wherein others obtain better results and why. One of the greatest disadvantages from which industrial corporations now suffer, in dealing with citizens, municipal or State authorities, is the fact that they cannot secure proper credit for the truthfulness of their statements, because there is no impartial and competent State department, or commission properly created and equipped, to investigate and publish regular reports upon the subject, excepting only the gas and electric lighting commission of the State of Massachusetts.

Government without the guidance of complete and accurate statistics is government by guessing, prejudice and superstition. The science of statistics is to government what the science of navigation is to ocean travel. It must be depended upon to guide progress on a true course to a desired objective point. A correct observa-

tion of an untrue compass, or an unintelligent observation of a true compass, must inevitably cause an error in direction. All theories as to a proper course must submit to the arbitration of facts. Measured by ascertained facts, all theories must stand or fall. Those who honestly advocate and those who honestly oppose a policy should vie with each other in enacting measures designed to secure a perfect record of the operation and results of such policy. The judgments of truth are rendered only with a knowledge of the facts.

*An "Association for the Public Control of Franchises"* in New York city affirms:

The Government must control natural monopolies (those public services which, from their nature, do not admit of competition), otherwise these monopolies will control the Government.

INVESTMENTS IN PUBLIC-SERVICE INDUSTRIES SHOULD BE PROTECTED BY THE STATE.

Industrial corporations have no power to decline to serve customers. Their plants and equipments cannot be removed to do duty elsewhere without having their value practically destroyed. Their services, which are the products of their labor, cannot be packed and transported to supply users in other municipalities. For these reasons their employers can have no equitable and should have no legal right to discharge them and employ others to take their places. If a municipality decides to own and operate a plant for the purpose of supplying a need on its own account, which is being supplied by an industrial corporation, considerations of justice and fair dealing require that it shall buy the plant in use instead of constructing a new one and thereby destroying the investment made for the benefit of the municipality when it did not desire to take up the business for itself. The duty of the State to protect investments that have been made in conformity with the requirements of its laws cannot and will not be questioned by any honest minded person. When investments are made in public-service industries the risk of loss by ordinary contingencies is assumed by the investors, but the risk of loss through a change in public policy, from private to municipal ownership, is not considered. On this point Professor Ely says: (1)

The mode of accomplishment in changing from private to municipal ownership, of course, requires careful consideration, but only a few suggestions can be thrown out at present. One of the most important is that a fair, but never excessive, value should be paid for the property acquired, and a fair value does not mean simply the cost of duplication of a plant. The policy which has been pursued (private ownership and operation) has been favored by the nation as a whole; and the nation as a whole, and not simply a fractional part of it (private owners of public service industries), should bear the loss. It is largely competition which has led to such enormous expenditures in this non-competitive field, and for this attempted competition the public at large is responsible. If it is insisted that a property should be purchased at cost of duplication, it makes one part of the community bear the loss due to a false social policy; and, moreover, to urge a hard policy with respect to purchase does more than anything can to defeat the reform.

This clear and sound assertion of the right of private owners to full compensation for their investments whenever a municipality shall deem it good policy to assume the ownership and operation of the industry in which

they are engaged aligns with the requirements of correct economic principles and of justice. Upon the basis Professor Ely here states, all honest-minded persons can agree. Others have no right to be considered. This basis is adopted by the laws of England and of the State of Massachusetts, as a requirement to be complied with by municipalities that change their policy from private to municipal ownership and operation of the means of supplying a public service. The English Government furnished a notable example of the recognition of this principle when it purchased all of the privately owned telegraph lines in the country on deciding to combine the telegraph service with its postoffice service.

#### RÉSUMÉ.

It is shown that those who oppose and those who advocate municipal ownership of municipal public-service industries agree:

1. That these industries are natural monopolies and should be recognized as such, and that they cannot be properly controlled by depending upon the enforced restraints of competition.
2. That they should be controlled by the State, acting as arbitrator or judge, in the interests of the users of the services, of the municipality, and of public-service corporations.
3. That investment in public-service industries should be protected by the State by requiring a municipality to purchase existing plants whenever it changes its policy, by discarding private and adopting municipal ownership and operation for supplying any one or all municipal needs.

This leaves the question of policy to be determined by the fact of economic advantage.

### RELIEF FROM VIOLENT FLUCTUATION IN DIRECT PRESSURE WATER SUPPLY.

BY JOHN R. HEIM, OF MADISON, WIS.\*

Our water supply system is the direct pressure. The city lies on seven elevations, the highest of which is 70 feet above pumps at station. This naturally causes violent fluctuations in the pressure through a sudden closing of hydrants, the breaking of hose in case of fire, the flushing of mains, the use of hydrants for sprinkling carts, or water motors and elevators. All are liable to cause a variation in pressure up to 40 pounds, and violent strains on the machinery, services and fixtures.

To overcome this difficulty and to give temporary relief from these sudden variations in pumpage and violent changes in pressure, we provided or attached an air chamber on the 16-inch supply main near the pumps, connected with a 14-inch pipe and a 14-inch valve. The chamber is made of riveted half-inch steel plate, 5 feet in diameter and 20 feet high, able to carry a safe working pressure of 200 pounds. At ordinary working pressure the chamber is filled with air. During a rise in pressure from 75 to 150 pounds the chamber takes in about 200 cubic feet of water, and the expansive force of the air in the chamber promptly returns this water to the mains in case of any

\* Address delivered at Denver convention of the American Water Works Association.

sudden demand for water beyond the capacity of the pumps at the speed at which they may be running, and it gives them time to gradually increase their speed to the requirements of the service; and in case of a sudden reduction in quantity caused by the closing of hydrants, causing a diminution in the draught, the chamber is again able to take up the corresponding excess of water, and gives the engines time to come down to their normal speed without strain, shock or breakage.

This air chamber is available at all times, whether we carry domestic or fire pressure, as a source of immediate supply, and affords a great relief to the violent fluctuations of pressure at such times. It is efficacious in all its intents.

At the bottom of the air chamber is a 3-inch drain pipe, and at the top a 2-inch feed pipe, connected with a small receiver which has a set of valves so designed that it can be relieved of the pressure in the air chamber and the water exhausted from it, when it will fill with air. By changing the position of the lever at the receiver the air contained in this receiver will then be forced into the air chamber by the water flowing from the latter to the former. This air chamber was attached to the system in 1892. To ascertain the actual benefit derived by its attachment, we decided when at leisure to make severe tests under all conditions, and its effect on the system, which was done between February 19 and March 6, 1893. We give you an average test made on the 20th and 21st of February, of ninety seconds at a time, with the sudden opening and closing of hydrant 200 feet from the pumps, discharging water from a 10-inch main.

At the Park Hotel, which by its elevation above pumps reduces the pressure to 30 pounds, an elevator is connected direct with our mains, requiring 100 gallons of water to lift the same to the fourth story, and detrimental to a direct system. A test was made which resulted as follows:

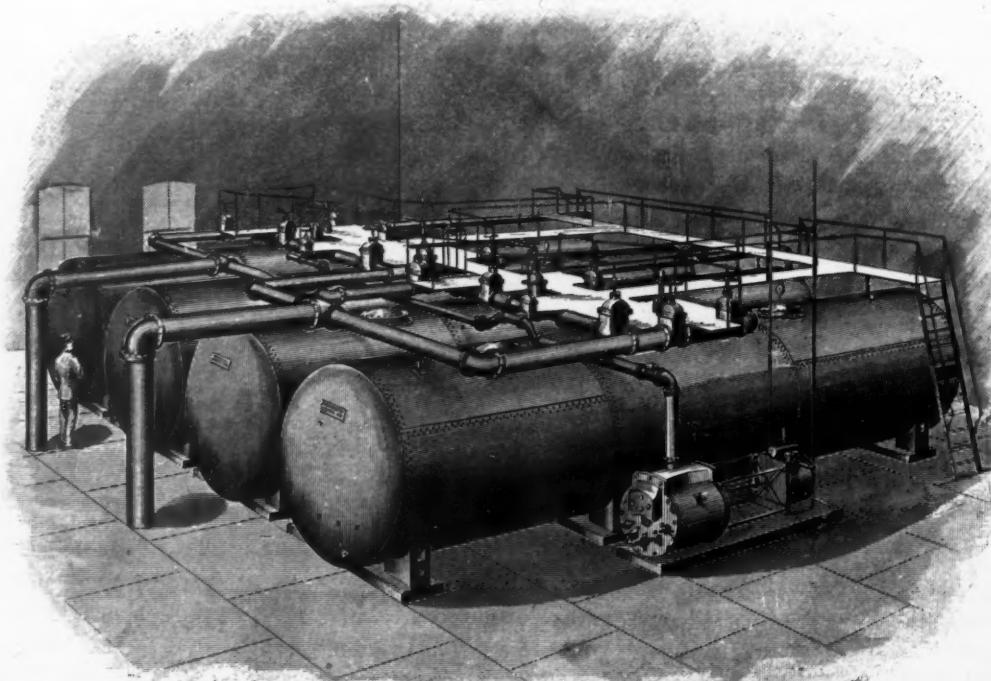
With air chamber cut off, the pressure dropped at the gauge in the station from 85 to 65 pounds in twenty seconds at the rise of the elevator, and returned to 85 pounds in twenty seconds at the stopping of the elevator, and a continuous vibration of the pressure gauge of from 6 to 7 pounds, whereas, with the air chamber the pressure dropped from 83 to 75 pounds in six seconds at the rise of the elevator, and increased from 75 to 83 pounds at the stop of the elevator in six seconds, and the continuous vibration at pressure gauge was within 3 pounds. This was with one lift of the elevator. Through the sudden opening of the hydrant with air chamber, the

engine speed was increased from forty to forty-five revolutions in twenty seconds, the pressure in main dropped from 71 to 67 pounds and increased to 72 pounds in twenty-five seconds. The sudden closing of the hydrant increased the pressure from 71 to 75 pounds, and the decrease of speed was from forty-five to forty revolutions. Without the air chamber, the engine speed was increased from fifty to sixty revolutions, the pressure in mains dropping from 83 to 63 pounds in from eight to ten seconds. By the sudden closing of hydrant, the engine speed dropped from sixty-one to forty-nine revolutions, and the pressure in the mains increased in proportion. The engine was not under control of the governor, but at the mercy of the pressure.

The air chamber has been attached for nearly five years, and has proven itself beyond a doubt the climax of a direct-pressure system, a great deal less expensive than a standpipe, and is always ready under whatsoever pressure. The cost of the air chamber, aside from the connecting, was \$1,150.

#### POLLUTED WATER PURIFIED.

The necessity of the filtration of public water supplies is so apparent in every community that no attention need be called to it at this time. A succession of cholera and typhoid fever epidemics in the cities of both Europe and America has caused water filtration to be regarded as



STANDARD CONTINENTAL FILTERS (HORIZONTAL TYPE). CAPACITY, 2,000,000 GALLONS PER TWENTY-FOUR HOURS.  $\gamma^3$

one of the actual necessities of life. Despite the fact that this necessity has been universally recognized, there are now in this country but few cities and public institutions which are equipped with proper filtration plants. In some places there seems to be doubt as to the best and most economical method of clarifying and purifying polluted water. The so-called natural or sand-bed system of filtration, used principally in Europe, is doubtless efficient, but at the same time it is cumbersome and expensive. Those who have given the

matter proper attention agree that for American cities there can be no doubt that the mechanical system is the most convenient and the least expensive. There are several successful mechanical filters, and particular mention may justly be made of the Continental. The makers of the Continental filter have an apparatus which will clarify turbid and muddy water, and will remove germs and bacteria from contaminated sources without the aid of alum. This filter has two separate and distinct filtering beds, one of prepared sharp sand to arrest the coarser particles, and the other of especially prepared fine material to produce a final purification. The depth of each bed is about 3 feet. The character of the material composing the beds varies to suit the quality of the water to be purified, as different classes of water require for their proper purification different kinds and grades of filtering media. The method of cleaning these mechanical filters is by a reverse current, which is applied in a manner that involves every portion of the filter bed uniformly. Connected with every filter is an apparatus by means of which air is forced through every particle of the filter material at intervals during the washing, keeping the filter material sweet and clean.

The construction of the Continental filter is simple, and is very easily and economically operated. The company puts in plants of all sizes, from that of a small-size filter for a private residence to a standard plant capable of filtering the entire water supply of a large city. There can be no doubt as to the efficacy of the Continental system, as it has long been in successful use in many places. The fact that the Continental apparatus positively purifies turbid and polluted water has been established beyond any question whatever, and this fact alone should be sufficient to commend the system to those who are now looking for a means of securing pure and wholesome water.

#### WATER DEPARTMENT NOTES.

—C. A. Hague, consulting engineer, 39 Cortlandt street, New York, has made a complete report on filtration to the board of water commissioners of Trenton, N. J., recommending an electrical pumping plant among other details for handling the water.

—Director of Public Works McAfee, of Allegheny, Pa., says: "The people of our city are now receiving water from the new Nine Mile Island works. The water is pure and it is satisfactory to the public. At least I am told so. When the old pumping station has been abandoned it is the intention to have a regular chemical analysis of the new supply of water. It is the belief of those who claim to know that it is much purer than was the water from the old pumping station."

—The improvements contemplated for the water works of Allentown, Pa., are a system of interchangeable valves at the pumping station, a new standpipe on the hill, back of the pumping station of sufficient height to supply the tallest buildings, the laying of the water main on Thirteenth street, from the new stand pipe to the city limits, and the division of the city into three water districts. It is also proposed to replace the pumping station with a plain substantial building, and to add to the pumping plant one 5,000,000 gallon pump, with boiler, boiler house, coal storage house, etc.

—Water meter register totals of the city of Chicago will hereafter be either taken by electricity or ink impressions. Startled by the boldness with which corrupt officials have plundered the funds of the meter department, Commissioner McGann has determined on a radical change in the method of reading meters, thereby destroying the possibility of rate takers being in collusion with property owners for the smashing of meters or the turn-

ing of them back with nippers. Commissioner McGann favors the electrical plan. This is nothing more nor less than the wiring of every one of the 4,000 meters in the city and connecting the wires with registering dials in the city hall, directly under the eye of the water office superintendent.

—Commissioner of Public Works McGann, of Chicago, is so thoroughly impressed with the idea that there is a combination of the water meter manufacturers, for the purpose of holding up prices, that he is thinking of having the city make its own meters. This proposition, he says, is feasible, because certain patents have expired, and a satisfactory meter can be made by the city. Chicago pays between \$30,000 and \$40,000 annually for meters. To secure the use of particular devices bribery and all sorts of corruption are said to have been resorted to in the past, and the department has been prolific in scandals. Moreover, the manufacturers have been able to keep up the prices to such a degree that the meter measurement of water is unpopular by reason of its cost to the consumer. Commissioner McGann figures that the city can make a meter not so much improved, but which will answer the purpose, and which can be put in for consumers at a reasonable expense. If manufacturers then reduce their prices he is willing to deal with them, but he does not propose to be clubbed or to permit any manufacturer to maintain precedence in the trade through the corruption of city employees.

—The ordinance under which the entire expenses of the water department of Buffalo, N. Y., are collected from the consumers will be amended so as to derive about one-third of the water fund from general taxation. Under the present arrangement the water consumers pay even the interest on water bonds, and for the water used for fire protection and other municipal purposes. "We propose to have the ordinance amended before the new water bills are sent out next May," says Public Works Commissioner Healy. "I do not believe any serious obstacles will be met with, either. It is so evident now that the expenses of the water bureau are not fairly divided among property holders that I hardly believe anybody will object to the new plan. What we are anxious to do is to reduce these special water taxes which have become such a burden. Take the rate on boilers, for instance. It is over \$1.70 per horse-power, and I really believe it keeps manufacturers away from the city. Now if we can reduce that a third, I believe it will be quite an inducement to manufacturers to come to the city. It is the same with all the other special rates. They are too high, and we calculate on reducing them one-third."

#### FIRE DEPARTMENT ITEMS.

—The city of Wilkesbarre, Pa., has purchased a Halloway chemical engine.

—Chagrin Falls, Ohio, has ordered a full-trussed hook and ladder truck of the Gleason & Bailey make.

—Freehold, N. J., has investigated the subject of rolling stock, and decided upon a Gleason & Bailey trussed ladder truck.

—It is said that Julius Pearse, the well-known chief of the fire department of Denver, Col., will soon resign his position and embark in the apparatus and supply business.

—The convention and tournament of the Pennsylvania State Firemen's Association will be held at Wilkesbarre, October 4-7. Arrangements have been made for entertaining the delegates in royal style.

—Another Gleason & Bailey hook and ladder truck won first prize at Beaver Falls, Pa., last week. The Whitaker, Pa., truck was the best appearing and finest equipped of

any in the parade. This apparatus was recently sold by the Gleason & Bailey Manufacturing Company, of New York, through their representative, G. R. C. Johnston, of Pittsburgh.

—Frank C. Mason, of Brooklyn, president of the International Association of Fire and Police Telegraph Superintendents, has gone to Nashville to attend the convention of his organization. On his return trip he will stop at Columbus to attend the mayors' and councilmen's convention.

—Andrew J. Kennedy, the honored president of the International Association of Fire Engineers, has resigned as chief of the fire department of New Haven, Conn. Mr. Kennedy was chosen chief of the New Haven fire department on January 12, 1892, upon the resignation of ex-Chief A. C. Hendrick. He has served as a fireman since 1846, having been a volunteer.

—The officers of the New York State Firemen's Association elected at the Schenectady convention are: President, Thomas O'Connor, Waterford; vice-presidents, Daniel Naylor, Schenectady, and W. E. Colgrove, Horseheads; secretary, Thomas Honahan, Frankfort; treasurer, Geo. H. Scott, Coxsackie; statistician, W. E. Churchill, Weedsport. The next convention will be held at Binghamton.

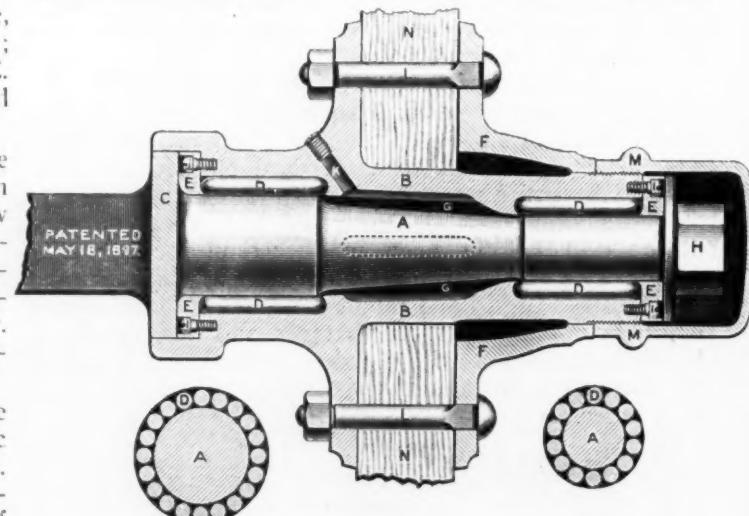
—Manager Graham, of the Chicago Auditorium, the building in which the Democratic National Convention was held last year, submitted a proposition to the New Haven Convention to put up \$30,000 with the National Association to be expended in premiums for a national tournament to be held in his building next year. The executive committee were instructed to co-operate with Mr. Graham in the arrangement of the details of the tournament.

—The fire commissioners of Springfield, Mass., have made some new rules to diminish the risk to the public involved in the turning out of the department to a fire. Perhaps the most striking is that which relegates the engine to a place behind the hose carts and other pieces of apparatus. It is also provided that only the companies that are nearest the fire will have to go to the fire on the run, the others who go being required to go at a trot or slow gallop.

—The new officers of the International Association of Fire Engineers are: President, A. J. Kennedy, of New Haven; vice-presidents, R. D. Walker, of Alabama; C. J. Kremer, of Arkansas; Henry A. Guthrie, of California; J. B. Hyatt, of Connecticut; E. E. Batty, of Colorado; G. W. Sasse, of Delaware; A. J. Harris, of Florida; L. M. Jones, of Georgia; E. T. Shepherd, of Illinois; C. W. Greene, of New Hampshire; I. P. Senger, of North Carolina; J. W. Dickinson, of Ohio; P. Prevost, of Ontario; J. J. McMahon, of Pennsylvania; P. Dorral, of Quebec; Chas. H. Swany, of Rhode Island; O. G. Marjenhoff, of South Carolina; A. J. Grant, of South Dakota; T. A. Mulligan, of Tennessee; J. W. Ryan, of Texas; Jas. A. Binford, of Utah; M. R. Murray, of Vermont; G. W. Taylor, of Virginia; J. C. Spencer, of Wisconsin; P. A. Rodell, of Wyoming; C. S. Woods, of Indiana; J. W. Bates, of Iowa; A. G. Waldon, of Kansas; W. N. Atten-sall, of Kentucky; J. R. Bulger, of Georgia; Frank B. Moody, of Maine; Thos. J. Casey, of Massachusetts; L. J. Lawyer, of Maryland; Thos. K. Harding, of Michigan; F. L. Stetson, of Minnesota; Geo. C. Hale, of Missouri; E. H. Rogers, of Manitoba; G. S. Lapp, of Montana; J. W. Edwards, of Nebraska; J. A. Campbell, of New York; F. V. Doane, of New Jersey; secretary, H. A. Hills, of Wyoming, Ohio; treasurer, D. C. Larkin, of Dayton, Ohio; board of directors, T. W. Haney of Florida, E. J. Jewhurst of New York, John T. Black of Minnesota, James Devine of Utah, M. S. Humphreys of Pennsylvania. St. Louis is the next meeting place.

### TRADE NOTES.

—Like all classes of reliable machinery, fire apparatus must be constructed upon the best principles in order to obtain good results. The first consideration is the solidity of the wheels; the second, the frame work. In the matter of wheels, those of a vehicle used for fire purposes have to undergo very severe trials, owing to the heavy weights they carry, and the roughness of the streets over which they sometimes have to travel, and the great speed attained. It is, therefore, a well-known fact that fire engineers are extremely particular in specifying the quality of wheels to be used in any special apparatus which they order, and manufacturers have to furnish the best article to maintain their reputation. For many years the Archibald Wheel Company, of Lawrence, Mass., the oldest and most reliable wheel manufacturing firm in the United States, has had almost an exclusive field in this business. In nearly every city and town where fire engines and trucks are in commission in the fire service



ARCHIBALD ROLL-BEARING AXLE AND HUB FOR FIRE APPARATUS, ETC., ETC.

A represents the axle made of special steel and case-hardened, with solid collar C, which is covered by the projecting end of the hub.

B represents the hub, and F, the loose flange secured to the hub by bolts L and holding in place the spokes N.

M represents the dustcap of brass or malleable iron screwed on the end of the hub, and covering the nut H.

D represents the hard steel rolls, held in place by the retaining rings E. Rolls are special long.

G represents the chamber or reservoir for oil which is supplied through the oil hole K, insuring long service without renewing the oil oftener than once a month.

This arrangement shows the fewest parts of any roller or ball-bearing axle yet produced. The box is one whole solid piece. There is no end pressure on the rolls. The box has a solid bearing against collar and nut without end play. The rolls held in place without cages produce the least possible friction, and the simplicity of construction insures the greatest durability.

they are mounted on Archibald wheels. The company has greatly improved the class of wheels it manufactures by the introduction of roll-bearing axles for heavy fire apparatus. It was considered an easy matter to manufacture ball-bearing axles for light vehicles, especially when protected by rubber tires; but they could not well be used on the present class of fire apparatus. If relief came at all it must be in a long and strong roll bearing; but in all former devices known there was so much enlargement of the box and hub called for and so much added weight as to make them all impracticable. The roll-bearing axle and wheel this company now makes is so perfect in every detail as apparently to leave nothing more to be desired, and this, too, without added weight or bulk. A remarkable thing also about these wheels and axles is that the price is so very reasonable. This roll-bearing improvement will not make any additional

weight to the wheels or axles, but will reduce from one-third to one-half the horse-power necessary to haul the apparatus; in other words, two horses will much more easily handle a first-class steam fire engine equipped with roll-bearing axles and wheels than three horses could do the same work, using the old axles heretofore in vogue. Another important feature in these new wheels is that they are self-lubricating, positive and sure; consequently exempt from wear and heating. They are uniform in each size, which is a matter of great importance in the wheels of fire apparatus. The Archibald Wheel Company is now making eight sizes of roll-bearing axles for the needs of fire departments, and it will well repay any chief engineer or manufacturer of rolling stock to write to this firm at Lawrence, Mass., for full descriptive particulars of their improved wheels and axles. The wheels apply also for use on heavy express and team wagons, trucks, beer rolls, etc., as well as on fire apparatus.

—CITY GOVERNMENT takes pleasure in calling attention to the new advertisement of Chas. G. Braxmar, of 10 Maiden lane, New York city, who is the leading manufacturer of badges in this country. Mr. Braxmar has the honor of furnishing all the badges for the Grand Army of the Republic, the Grand Lodge of Masons, the Grand

Lodge of Elks, the International Association of Fire Engineers, the New York and Pennsylvania State Firemen's Associations, the National Street Lighting Association, the fire departments of New York and Chicago, and many other organizations. Mr. Braxmar has just finished two diamond studded badges, one for the Grand Master of the Masons and the other for the Grand Exalted Ruler of the Elks, which are probably the most gorgeous and expensive specimens of the badge maker's art ever produced.

—The M. C. Lilley & Co., of Columbus, Ohio, extend to the mayors and other city officials who will attend the convention in that city this month a cordial invitation to visit their plant. A visit to this plant will be especially interesting to those interested in fire protection, as the factory is built on model lines, as is shown by the fact that the fire insurance rate is the smallest of any manufacturing building in the city of Columbus, and as small as any in the State of Ohio.

—J. A. Lambert, of Atlanta, Ga., Southern salesman for Gleason & Bailey Manufacturing Company, reports increasing trade, and sends an order for a handsome racing apparatus for Dalton, Ga.



## DIXON'S SILICA GRAPHITE PAINT

FOR TIN OR SHINGLE ROOFS AND IRON WORK. Tin roofs well painted have not required repainting for 10 to 15 years.

If you need any paint it will pay you to send for circular.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.



NEW YORK, August, 1897.

It has come to our notice that reports are being industriously circulated to the effect that THE ALCATRAZ COMPANY has sold out its interests to the Trinidad-Bermudez combine and that the production and use of Alcatraz Asphalt is controlled by such combine. Such reports have been circulated more particularly in Buffalo, Cleveland, Erie, Detroit, Saginaw and Hoboken, cities in which Alcatraz Asphalt has come into direct competition, at the recent lettings, with the asphalt of the Trinidad-Bermudez monopoly.

These reports have been circulated evidently with malicious intent, to deceive the municipal officers and taxpayers of cities throughout the United States by leading them to believe that GENUINE COMPETITION could not be obtained from the bids of those using ALCATRAZ ASPHALT.

We declare all such reports and rumors to be absolutely and entirely false.

## THE ALCATRAZ COMPANY.

WILLARD T. BARTON, General Eastern Manager.

# American Car Sprinkler Co.

(INCORPORATED.)

F. W. WELLINGTON, Pres.  
M. J. WHITTALL, V. Pres.

ALFRED THOMAS, Treas.  
FRANK D. PERRY, Gen. Supt.

Contracts Solicited for Sprinkling Entire Cities.

## SPRINKLING CARS LEASED

on Reasonable Terms.

Local Companies Formed for Carrying on Work of Street Sprinkling.

Worcester, Mass.

THIS COMPANY controls all patents of the United Tramway Sprinkler Co., Louisville, Ky.



# “Contracting and Purchasing Directory.”

## AIR LIFTS.

Geo. J. Kennedy, 1801 Gratz St., Philadelphia, Pa.

## ALARM SYSTEMS, FIRE AND POLICE.

Gamewell Fire Alarm Telegraph Co., 19 Barclay St., N. Y.

Partrick & Carter Co., 125 South 2d St., Philadelphia.

U. S. Fire and Police Telegraph Co., 246 Washington St., Boston.

## ASPHALT.

Alcatraz Co., San Francisco and N. Y.

## AIR COMPRESSORS.

Clayton Air Compressor Works, 23 Cortlandt St., New York.

## ASPHALT MIXERS.

Erie Machine Shops, 18th and Peach Sts., Erie, Pa.

## BADGES AND MEDALS.

Chas. G. Braxmar, 10 Maiden Lane, New York.

## BAG CARRIERS.

Thornton H. Motley & Co., 43 John St., N. Y.

## BATTERIES.

Gordon-Burnham Battery Co., 82 West Broadway, N. Y.

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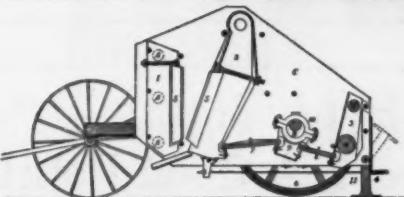
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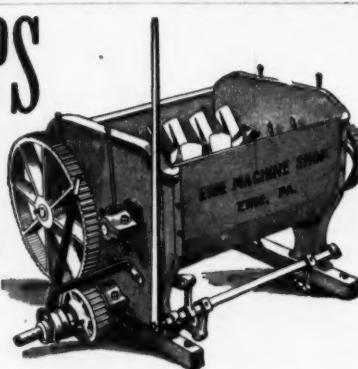
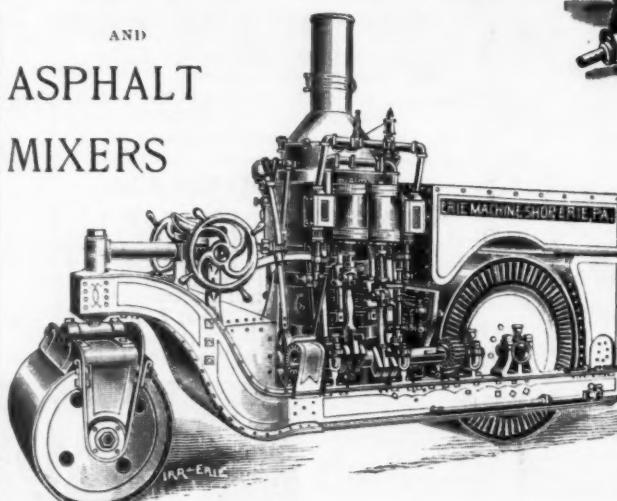
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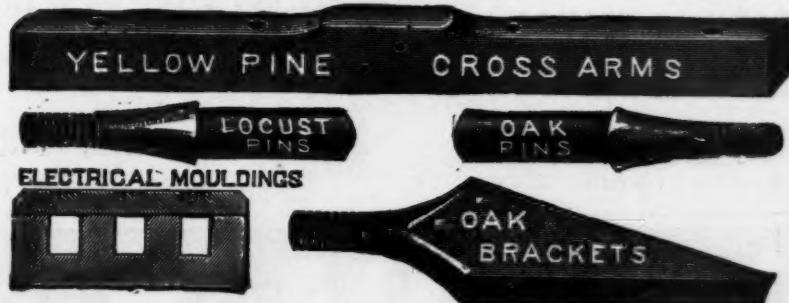
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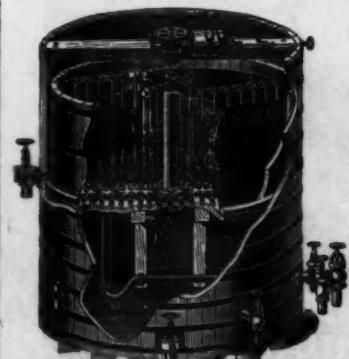
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